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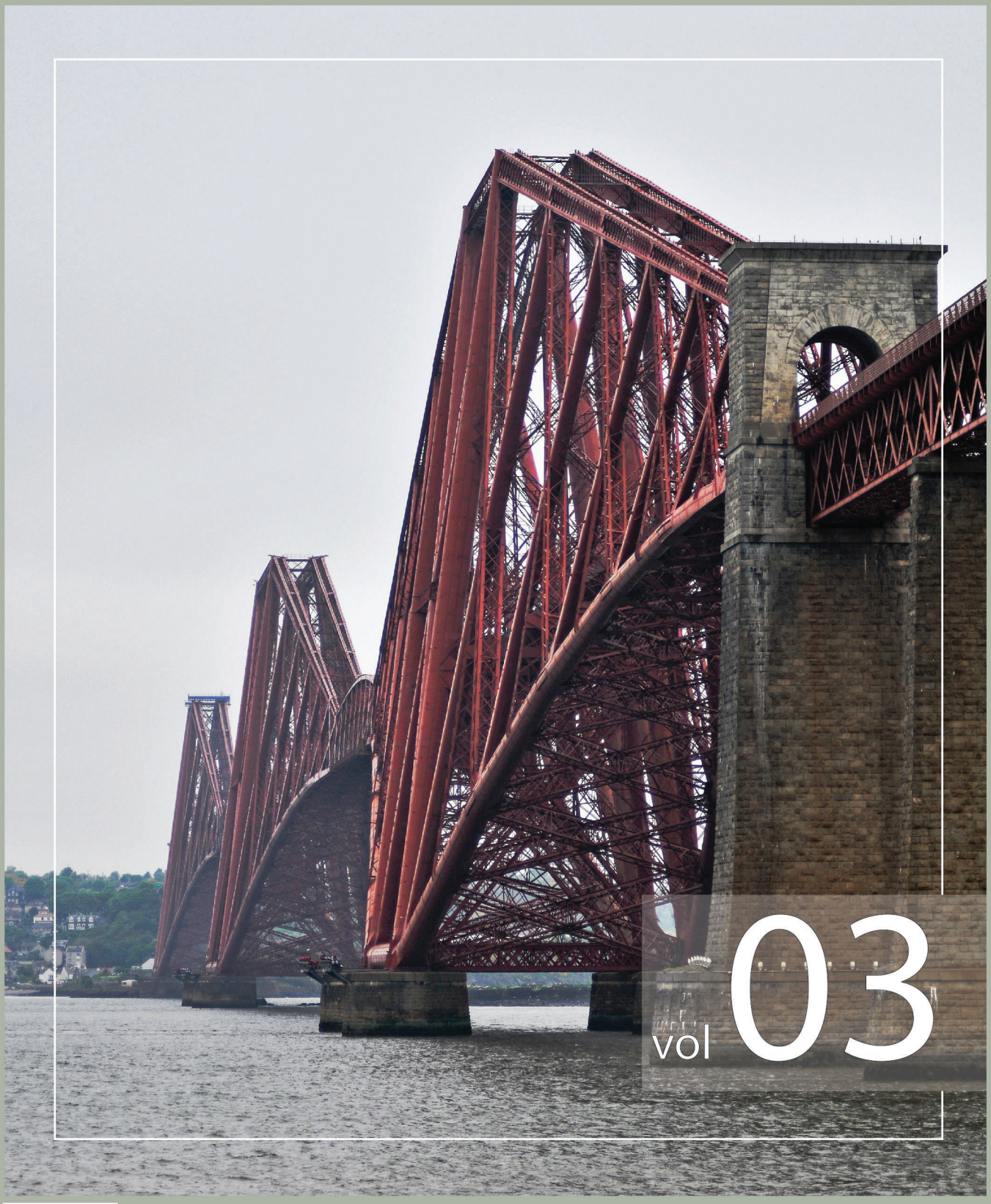

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Editorial

Mehmet Topçu (Editor in-Chief)

JOURNAL of DESIGN for RESILIENCE in ARCHITECTURE and PLANNING (DRArch) has published Volume 3 issue 3 with articles of high scientific quality. This issue includes articles under main headings. The first group focuses on micro scale with interior space, while the second group focuses on urban conservation at the macro scale. The third group of articles examined the relationship between the concept of resilience and technology. The last group is about education, which we care to take place.

Volume 3 Issue 3 begins with a study titled as “New Possibilities of Living Together in Post-Humanist Society: Interior and Furniture Design for Pets” written by Neşe Başak Yurttaş and Damla Altuncu. We think that this study analyzes a fairly new and universal issue. The hypothesis of this study, in which current examples of interior and furniture designs suitable for the physical needs of pets, whose numbers are increasing day by day, are discussed with an inclusive approach in interior architecture; It has been determined as 'when the interiors where pets live are redesigned according to the characteristics of the animals, ergonomics is provided for 'all living things' in the common living areas. The subject of common living space in the literature; Although it has been investigated in interdisciplinary fields such as cognitive psychology, zoology, and architecture on topics such as biodiversity, sustainability, animal welfare, and animal behavior, the subject of 'space organization of shared living spaces shared with domestic animals' as a new approach in the field of interior architecture has not been sufficiently discussed. The second article is also deal with interior design just like the first study. “Spatial habits in residential kitchens and the searches for flexibility in kitchen design” has been prepared by Eren Can and Mahmut Atilla Söğüt. Flexibility, which can be considered in many ways, is examined in this article with the space organization, equipment/outfit and time in kitchen design. In the study, it is argued that while it is possible to develop more creative and multifunctional kitchen solutions in changing square-meters, it is due to the imitation of the same plan templates of build-and-sell managerships in the apartment building process in big cities.

Mert Nezih Rifaioğlu prepared an article in the second group which focuses on urban conservation at the macro scale. The article titled as “Interpreting living urban-industrial heritage: The Jewellery Quarter, Birmingham” focuses primarily on the critical viewpoint of theoretical content of the interpretation of cultural heritage sites. In the light of theoretical and practical knowledge, the research then concentrates on key themes and discussions on heritage interpretation in the UK. Accordingly, the research discusses the interpretation strategies in the Jewellery Quarter, Birmingham which is the one of the most influential areas by means of historical urban-industrial heritage site.

Gülçin Kahraman and Ümit Turgay Arpacıoğlu made research dealing with urban conservation in macro scale similar to Rifaioğlu. The article is “Conservation problems of rural architecture: a case study in Gölpazari, Anatolia”. The purpose of this study is to determine the rural architectural heritage that is about to disappear, preserving, and developing policies to increase the interest in rural as a representative settlement Gölpazarı which has been an important settlement from prehistoric times until today in Central Anatolia.In this study, the rural architectural heritage and conservation problems of Gölpazarı and its villages were evaluated. “Exploring Lost Spaces towards Regaining Them for Urban Life: The Case of Konya Historical City Center” is in the same group prepared by Kadriye Topçu and Büşra Ünal. The aim of the study is to identify the lost spaces in the historical city center of Konya city, which was chosen as the sample area, and to identify the urban space(s) that should be intervened in with priority among the identified lost spaces.

Özlem Sümengen and Gamze Merve Şengönül shared with us a study that will be important for technology and standards. ”Investigation of daylight performance in traditional residential buildings in the context of EN- 17037 standard - Sivas Hubiyar Korucu Mansion” focused on daylight penetration in traditional Turkish houses in the context of EN-17037 and a traditional Turkish house evaluated as case study. As a result of the evaluation made in the context of EN 17037 standard, attention was drawn to the importance of openings as windows in traditional Turkish houses.

Another interesting paper titled as “Leveraging discrete event simulation modeling to evaluate design and process improvements of an emergency department “comes from Zahra Zamani. This research intends to exemplify the practical application of the Discrete Event Simulation (DES) approach for evaluating the

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effectiveness of suggested processes and design modifications in improving the existing bottlenecks of an Emergency Department. Mehmet Cetin and Osama B Muragaa Alrabiti contributed to this issue with the following article “Determination of appropriate areas in terms of bio comfort by using summer temperature index with the help of GIS throughout Ordu province”. The paper aims to determine the suitable and unsuitable areas in terms of bio comfort in summer by using New Summer Index throughout Ordu province via GIS.

The last article belongs to last group namely education. Alperen Meral, Emrah Yalçınalp, and Özgür Demirci researched a question they expressed in the title. The title is “Who is designing for whom? A critical design studio approach”. Studio studies can easily be defined as the cornerstone of the discipline in departments giving architectural education. Although the educational process differs in educational institutions and among the educators, its main purpose is always to give the best experience on design process to the students and to bring together different space designs and functions with certain criteria. The aim of this research is to examine whether the projects differ in terms of functionality regarding their different user profiles determined by the students, based on the studio work of Karadeniz Technical University, Department of Landscape Architecture within the scope of Environmental Design and Project II course. As a result of the examination, it has been determined that although the designer and customer profile are different, the morphological differences in designs are not perceived very easily, which means the methodology in the studios should be examined again.

As the Drarch editorial team, our motivation is increasing with the interest of readers. As the editor-in-chief of DRArch, I would like to extend my deepest gratitude the intense interest of researchers and the care of our referees. Enjoy your reading,

best regards...

Following names that provided valuable contribution as referees of articles in this issue are:

Ayşenur Albayrak (Assist Prof. Dr.), Çanakkale Onsekiz Mart University
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DRArch's objectives are:

- to question how future building technologies are revolutionizing architectural design, city planning, urban design, landscape design, industrial design, interior design and education,

- to catalyze the processes that lean on interdisciplinary and collaborative design thinking, creating a resilient thinking culture,

- to improve the quality of built environment through encouraging greater sharing of academicians, analysts and specialists to share their experience and answer for issues in various areas, which distributes top-level work,

- to discover role of the designers and design disciplines -architecture, city planning, urban design, landscape design, industrial design, interior design, education and art in creating building and urban resilience,

- to retrofit the existing urban fabric to produce resilience appears and to support making and using technology within the building arts,

- to discuss academic issue about the digital life and its built-up environments, internet of space, digital in architecture, digital data in design, digital fabrication, software development in architecture, photogrammetry software, information technology in architecture, Archi-Walks, virtual design, cyber space, experiences through simulations, 3D technology in design, robotic construction, digital fabrication, parametric design and architecture, Building Information Management (BIM), extraterrestrial architecture, , artificial intelligence (AI) systems, Energy efficiency in buildings, digitization of human, the digitization of the construction, manufacturing, collaborative design, design integration, the accessibility of mobile devices and sensors, augmented reality apps, and GPS, emerging materials, new constructions techniques,

-to express new technology in architecture and planning for parametric urban design, real estate development and design, parametric smart planning (PSP), more human-centered products, sustainable development, sustainable cities, smart cities, vertical cities, urban morphology, urban aesthetics and townscape, urban structure and form, urban transformation, local and regional identity, design control and guidance, property development, practice and implementation.

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Editorial Team

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Research Article
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New possibilities of living together in post-humanist society: Interior and furniture design for pets

Neşe Başak Yurttaş*
Damla Altuncu**

Abstract

With their various physical differences, pets have to live with their owners in interiors, which is designed according to human scale. On the other hand, human-specific anthropometric measurements, which are the basic parameters in space design, are not sufficient to provide ergonomics in indoor spaces, which are also living spaces for pets. The hypothesis of this study, in which current examples of interior and furniture designs suitable for the physical needs of pets, whose numbers are increasing day by day, are discussed with an inclusive approach in interior architecture; It has been determined as 'when the interiors where pets live are redesigned according to the characteristics of the animals, ergonomics is provided for 'all living things' in the common living areas. The subject of common living space in the literature; Although it has been investigated in interdisciplinary fields such as cognitive psychology, zoology, and architecture on topics such as biodiversity, sustainability, animal welfare, and animal behavior, the subject of 'space organization of shared living spaces shared with domestic animals' as a new approach in the field of interior architecture has not been sufficiently discussed. For this reason, the research is a pioneering and descriptive study in terms of drawing attention to current practices in terms of conceptual infrastructure, architectural design, space organization, application examples and experimental models, making a systematic review of existing studies on the subject, and identifying new trends in the field of interior architecture. The aim of the research is to expand the interior design, which is a multidimensional subject, to include spaces designed for living with pets, in particular the arrangement of common living spaces. Since subjects such as interior design, interior architecture, and design have a wide field of research, the scope of the study is limited to the specific space and furniture designs designed for pets in terms of ease of research. In the descriptive study, the survey model, one of the quantitative research methods, was preferred as a research method to review the existing status of the researches in the field of design within the existing sample applications. As a result of the study, it has been understood that the 'interior and furniture design for pets' approach is a design approach that is open to development, is an inclusive application in the interior and has a high potential to be preferred.

Keywords: ergonomics, common living areas, interior design, post-humanist society, inclusive architecture

1. Introduction

The first article of the United Nations (UN) Universal Declaration of Human Rights (UDHR-1948) states that "All human beings are born free and equal in dignity and rights". According to this expression, 'equality' is a fundamental right that all human beings should have from birth. The design approaches produced within the principle of equality, which is accepted as a fundamental right for people, have been developed for the regulation of democratic usage conditions of common spaces. In this respect, the inclusiveness of the arrangements made in order to provide the physical comfort conditions in the artificial environment in which the users live in spite of various differences in inclusive common living spaces is still being discussed.

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With the invention of the steam engine by James Watt in 1789, the influence of man on nature was strengthened, and after this date, which is considered the beginning of the industrial revolution, the human-centered anthropocene approach has become increasingly important for the regulation of the artificial environment. Thanks to the positivist understanding of the 18th century and the modernism that developed in parallel with the optimism of the enlightenment period, ergonomic principles were determined to provide machine-human harmony with the priority of human measurements. This situation has led to the development of the literature on the nature-human-machine relationship on the axis of human characteristics and the creation of new regulations. These arrangements, which are based on anthropometric measurements within the human-centered design approach of modernism, are in the literature; design for all, inclusive design, lifespan design, and human-centred design. In this case, it can be said that the users covered are only 'humans' and that other living things with whom we share common habitats are excluded from the nature-human relationship.

Approaches to living together with the natural environment and other living things in architectural theory; It can be argued that before the modernist period, when the anthropocene approach began to become widespread, it emerged with the desire of humans to control nature. In these approaches, which center the nature-human unity in the center with a utilitarian perspective in the architectural literature, the focus is mostly on the subject of 'modern man living together with nature'. In the 'anthropomorphic space of common life' defined here, only human was seen as superior, and all other living things were thought to be at the service of humans. In this approach, which suggests a commensal life rather than a symbiotic life; while it is said that humans should benefit from living things living with humans, artificial environmental features and physical comfort conditions suitable for these creatures are ignored. In this context, while anthropomorphic space proposes an integrated framework in terms of socio-cultural-spatial, it does not have normative concerns for other living things other than humans.

In the spaces shaped according to the anthropomorphic understanding, other living things other than humans have had to live in artificial environments designed as human-centered, although they share the common living space. The 'adaptation' of existing designs according to the characteristics of other living things, in the focus of ergonomic principles, does not sufficiently provide the physical comfort conditions of a life that can be described as symbiosis. This discrimination problem, which arises between humans and other living things in the design of common living spaces, is as much a spatial problem as the 21st century anthropocene design approach. According to its terms, it needs to be re-discussed for the post-human period in the future.

The post-humanist understanding, which started to become widespread in the 21st century after the anthropocene design approach, made us think that other living things should have equal physical comfort conditions in their living environments. The post-humanist understanding, which is defined as post-human, is getting stronger in parallel with the propositions of industrial and functionalist discourse that focus on the non-human. The post-human period, which started to be discussed with the increase in the widespread use of computers in daily life with the 3rd Industrial Revolution in the 20th century, points beyond the understanding of trans-humanism, which is seen as the extreme point of human-machine interaction.

Social actors, who became atomized in terms of social relations in the post-humanist period, remembered the other living things they lived with and tried to establish a new living environment with them. The reflections of this effort, which can be evaluated within the scope of critical humanism, unlike the characteristics of anthropomorphic space, have been embodied by the increase in the pet population in common life. As of 2022, it is known that there are 110 million cats, 89.8 million dogs, 51.9 million birds, 29.8 million small mammals, 15.4 million aquarium creatures and 9 million reptiles registered as pets in EU countries. Considering that these creatures share the same living environment with humans, it can be said that interior and furniture design has become a necessity for other living things besides humans. The hypothesis of this study, in which current examples of interior and furniture designs suitable for the physical needs of pets,

whose numbers are increasing day by day, are discussed with an inclusive approach in interior architecture; It has been determined as 'when the interiors where pets live are redesigned according to the characteristics of the animals, ergonomics is provided for 'all living things' in the common living areas.

In the literature, inclusive architecture practices have generally been examined in terms of human users, and the concepts of nature-human-environment have not been sufficiently investigated in terms of other living things we live with. In this respect, the study; It is a pioneering and descriptive study in terms of drawing attention to current practices in terms of conceptual infrastructure, architectural design, space organization, application examples and experimental models, making a systematic review of existing studies on the subject, and determining new trends in the field of interior architecture.

The aim of the research is to expand the interior design, which is a multidimensional subject, to include spaces designed for living with pets, in particular the arrangement of common living spaces. However, as a result of the evaluation of existing applications, the design orientations of the space designers will be tried to be determined. For this reason, since subjects such as interior design, interior architecture, and design have a wide research area, the scope of the study is limited to the specific space and furniture designs designed for pets in terms of ease of research. In this context, unqualified pet items that cannot be considered as design elements placed in spaces designed for people and design attachments placed in the existing space without being designed are excluded from the scope. The socio-cultural and economic differences of the countries where the images were taken are excluded from the scope.

2. Literature Survey

In determining the conceptual infrastructure, in the thesis database of the Higher Education Institution (YÖK), in the Dergipark academic database, in the architecture web database, in the Google academic Turkey database and in the library catalogs of the universities with architecture/planning and design departments; the keywords 'Ergonomics, Common Living Spaces, Interior Design, Post-Humanist Society, Inclusive Architecture' were searched in Turkish and English. As a result of the research, until October 2022, 4 thesis, 11 books, 16 article, 2 papers were determined, and 6 of these studies were selected for research. Inclusion and exclusion criteria for the selection of studies were established based on the PICOS method. In the second stage, the researches constituting the sample set; year, subject, method, area of expertise, bibliography, universities and institutes were categorized and subjected to content analysis. As a result of the analysis, the subject of common living space in the literature; Although it has been investigated in interdisciplinary fields such as cognitive psychology, zoology, and architecture on topics such as biodiversity, sustainability, animal welfare, and animal behavior, it has been understood that the subject of 'space organization of shared living spaces shared with pets' as a new approach in the field of interior architecture has not been sufficiently discussed. It has been determined that most of the definitions are made within the anthropocene approach.

Along with the anthropocene, which emphasizes the extent of the impact of human activities on other beings in the universe, posthumanism has a tendency to move man away from the focus of this mindset. Posthumanist thinker Rosi Braidotti defines humanism as the dominant model for humanity (Braidotti, 2013). Beginning with the Renaissance and reaching its peak with modernism, the potential of human beings to take control of beings other than himself has increased with the impact of developments in basic fields such as biology, psychology, medicine and the advancement of technology. While the approach of anthropocene thought was rising, the mentality of Humanism centered on human existence was also opened to discussion. According to the anthropocene approach, there are different opinions in the literature on the date of the beginning of the change of ecosystems by humans. According to this understanding, Crutzen & Stoermer, Zalasiewicz showed the 19th century Industrial Revolution as the beginning, Nakicenovic & Stewart dated the beginning to the 18th century, and Meybeck started this period in the 1950s.

The concept of anthropocene, which is generally defined by naturalists, entered the literature after becoming a common term used by many disciplines. The word anthropocene is a combination of two Greek words with etymological origins. These; 'anthropos' meaning human and 'kainos' meaning new. The suffix -cene gives the meaning of "belonging to the last period" to the word (Peters, 2012). According to Rafferty (2020), who interprets the word etymologically as 'the last human age', the word anthropocene was coined by Biologist F. Stoermer in the 1980s and was used in the literature by Nobel Prize Winner Paul J. Crutzen in 1995 in Chemistry. Crutzen and Stoermer, who studied ozone, used the concept of anthropocene to emphasize the destructive effect of man on nature. As the pressure and dominance of man on nature increased, the area of destruction also expanded. Concepts such as ecology and sustainability, which were developed as a solution to this, still continue to be discussed. In 2008, according to the theory of British geologist Jan Zalasiewicz, it was stated that the Earth passed from the holocene to the anthropocene era, as the negative effects of humans on the environment on a global scale became irreversible. According to Crutzen and Steffen (2003), who started this transition with the Industrial Revolution, the 18th century. At the end of the century, the driving force of change was the anthropocene approach. In this respect, since the second half of the 18th century, the idea of domination over nature, which was deemed necessary for change, has left its place to worry because we see the irreversible consequences of the destroyed nature.

The human being, who degrades, transforms and destroys the natural environment, has also removed the beings within the ecosystem from their natural habitats. This thought led to the questioning of the symbiotic life style of humans and other living things, thus the concept of ecology was born. The word ecology, which was used for the first time by Henry Thoreu in 1858, consists of two Greek words as etymological origin. These; 'oikos' meaning home-space and 'logos' meaning science. In this case, it can be said that ecology, which was defined as a science in the 19th century, is the science of the natural habitats of living things. With Elton's book 'Animal Ecology' published in 1927, ecology, which focused on the habitats of animals at first, drew attention to natural environments for plants and humans with the environmental crises in the 1960s. In the 21st century, ecology is separated from its atomized structure and covers the entire ecosystem from subatomic particles to universe dimensions with a more holistic "ecological systems theory" approach.

Design of a living environment in which all living and non-living beings that make up the whole live together; can be explained with the concepts of symbiosis, mutual living or collective life. The interrelatedness of these entities can be explained by the concept of 'synergy', a Greek word meaning 'working together'. Accordingly, synergy is defined as "the behavior of integrated systems that cannot be predicted from the observed behavior of the different parts that make up a system or from the interconnections of the system" (Fuller, 1975: 3). These artificial living environments, which can be designed with a biological solidarity-based approach necessary for the continuity of life; they are formed from genetic theories with organismic and evolutionist approaches or according to the eco-system approach. Among these approaches, according to the 'ecosystem' approach, which was defined for the first time in the article of botanist George Tansley in the journal Ecology in 1935, the functioning of a community depends on the place of inanimate objects in the living environment as well as the relationship between living things. In this context, while living things other than humans, whose natural environment has been destroyed, continue to live in artificial habitats designed by humans, the ecosystem to be created between humans, animals and things should have a synergetic structure as well as symbiotic.

The design discipline is as much a result of humanism as any other discipline. However, limiting design to its origins in humanistic thought marks an unsustainable way forward, not only ethically but existentially. Posthumanism allows for a rethinking of design in ways that displace the human at the center of thought and action with the materially, ethically and existentially interconnected humans and nonhumans (Wakkary, 2021). In order for this interaction between humans, animals and things to function smoothly as in natural life, the objects in the ecosystem to be created in the

interior are not only for humans; it should be designed to meet the needs of living things other than humans. The concepts of this new ecological architecture approach, which are defined as animal-first architecture, pet-friendly architecture, nature-friendly architecture or barkitecture in the literature, were explained in William Thomas's book The Dog Rules in 2000. Although there are differences between these concepts, the problem that the approach is based on is the rearrangement of the artificial environments in which other living things, which have to live in environments designed for humans, live according to their characteristics for a symbiotic life indoors.

3. Material and Method

A two-stage methodology was applied in the study. In the first stage, the existing researches were examined and the definitions of the concepts related to the subject were clarified with reference to the sources in the existing literature. In the second stage, the images of current public space and furniture applications were evaluated by content analysis method in accordance with the theoretical infrastructure.

Google, Bing and Yahoo Search search engines were used to determine the existing space and furniture applications. The keywords 'Ergonomics, Common Living Spaces, Interior Design, Post-Humanist Society, Inclusive Architecture', which are used to determine the conceptual infrastructure, were searched in Turkish and English in the search of images. However, the main research subject in the study is; the words animal-first architecture, pet-friendly architecture, nature-friendly architecture and barkitecture were also searched in Turkish and English languages in various databases.

Various interior and furniture images obtained from different digital databases were used as research material. In the study, as a research method, scanning model, one of the quantitative research methods, was preferred to review the current situation. The general screening model, which was preferred to create the research population of the descriptive study, was deemed appropriate for the study in terms of making a generalizable judgment as a result of the systematic review. In this respect, it can be said that a systematic review is a comprehensive synthesis of a large number of samples that have chosen similar methods to identify the evidence produced by experts and reconstructed. The importance of systematic review in the disciplines of architecture and design is increasing, as it is convenient to produce strong arguments from evidence-based practices in discussions conducted over samples.

In the study, the stages of accessing the images accepted as documents, checking the originality of the images and analyzing the data were followed. At the stage of accessing the documents, it was tried to reach the data sources within the inductive method. The media sets of the images in the digital databases were obtained by typing the keywords in Turkish and English into the image search section of internet search engines.

4. Experimental Results

Pets are adopted as members of their families in the eyes of their owners, so the place where they live together is considered their "home". When the living spaces, which are described as homes, are designed by considering the ergonomic characteristics of animals living in the same place with humans (symbiotic life), environmental harmony will be improved and animal welfare will also be ensured. For this reason, pet owners felt the need to reorganize their spaces according to their symbiosis characteristics so that all individuals feel safe and happy as a family in their living space. Having an ergonomic, comfortable and well-designed common living area for all members of the family will lay the groundwork for providing the conditions necessary to lead a life together. If the symbiosis space organization is planned in accordance with living together with our pets, pets and their owners will have a comfortable, hygienic and orderly living space, and thus, it will be ensured that the joint activities are enjoyed together. Apart from the spaces designed within the framework of ergonomic principles specific to human beings, spaces shaped according to animal

characteristics have caused the issue of rearrangement of common living spaces to be discussed in the field of design. These discussions necessitated looking at current design approaches from a different perspective. This situation not only changes the understanding of design, but also rethinks the sources and scales used as data in the stages of the design process. In our common living spaces, especially in our homes, the decisions to be taken at the beginning of the design process and the special details to be resolved in this direction will make these spaces more qualified and functional.

Pet spaces for symbiosis cannot be designed with jewelry and items added to the space, unlike spaces designed for human users. Based on this idea, pet items that are placed in spaces designed for people, purchased later and are add-ons will not be enough to make our common areas suitable for living together. It can be said that the place we live in is defined as a common living space for humans and animals, thanks to the practical details that were added to the interior design during the project design process according to the design approach developed within a symbiotic life, facilitating our lives with our pets, providing hygiene and producing solutions for self-care needs.

Figure 1 Entrance Hall, wet area (URL-1)

Figure 2 Laundry area, food stations (URL-1)

The space example in the image shows the details created during the project design process (Figure 1). The most important finding that these details were created during the project process is that the sanitary installation was placed in a section that is not considered a wet area for human users. A pet washing area (paw washing unit) located in the entrance hall will contribute to the cleaning of a dog that spends time outside when entering the house, thus ensuring that the house is more hygienic, and that the self-care needs of a pet dog are met in a practical way. In this example, the wet area planned with the furniture unit created for shoes and outerwear in the entrance hall contributes to the common living area as a surprising and functional addition. This area is also open to people. It can be mentioned that this wet area, which can be used for cleanliness and order, is a detail that provides comfort and hygiene for both humans and animals. This wet area detail, which is not seen in ordinary house entrance planning, contributes to the organization of space as a useful and functional detail for people when considered in detail.

In the other image, a residential laundry room has a dog food station integrated into the furniture unit, neatly placed under the sink (Figure 2). This detail provides a practical organization for pets and their owners, creating a neat and hygienic solution. The most important finding showing that this detail was not added later in the project process is that the fine building details show integrity, and the unit was designed as a fixed space element, not as a movable furniture. Storing pet food or items in the cupboards in the laundry room also provides a clean and tidy planning by creating a settled order.

Considering that pets enjoy spending time with their owners and want to be with them most of the time, a special niche integrated into the kitchen island, as seen in the first example, will be a safe and happy space for pets such as cats/dogs (Figure 3). In the other example, it is related to the fact that the area designed according to animal ergonomics is a piece of space rather than a mobile item (Figure 4).

Figure 3 Niche detail in the kitchen island (URL-1)

Figure 4 kitchen unit pet partition (URL-1)

In another example, a naturally occurring space under the stairs was designed to create a special area for pets (Figure 5). Similar to the other example, this space, which was designed according to animal ergonomics within the existing space, is an important proof that design should not be made 'only for humans' in the symbiosis approach.

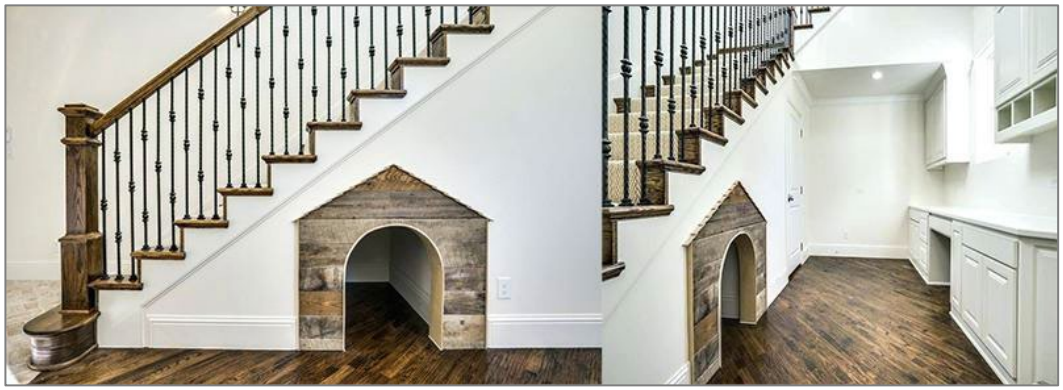


Figure 5 Under-stair pet area (URL-1)

In common living areas, “washing units” planned as a part of the design appear as a practical solution. These spaces, which can be considered as a separate wet space within the wet spaces, can also be considered as predecessors due to their functional and design approach that prioritizes the needs of animals. It is understood from the findings obtained as a result of the research that such space organizations, where the comfort of both types of users (human-animal) are considered, are becoming increasingly common (Figure 6-7). These washing stations, which are planned in wet areas such as the laundry room and guest bathroom, create a comfortable area for pets and their owners. It can be mentioned that these units constitute units that are open to the use of animals as well as humans, that support the act of maintaining cleanliness and order, and contribute to the organization of space. In this direction, it can be said that these areas are special solutions that serve the common use of humans and animals

Figure 6-7 Pet wash stations (URL-2,1)

Cats by nature like to climb, jump, move from one object to another and create a track where they provide physical activity. Accordingly, it can be said that spaces designed according to the

unique characteristics of animals are a criterion to be considered in terms of common living spaces. Solutions to be created for the needs of our pets in interior design and furniture selection contribute to the emergence of space organizations planned with a pet-friendly orientation.

Figure 8 Interior design ceiling detail (URL-3)

In the visual, the ceiling detail, which is a part of the interior design, creates a walking path, in other words a track, as part of a space design for cats, while at the same time helping them to embrace their environment and establish a sense of belonging (Figure 8). The living area in the example, which is open to human-animal common use, has been privatized by adding a detail for animal use only. In line with the findings, it was understood that the analysis we performed for human users should also be performed for animal users.

Figure 9 An example of interior space multifunctional wall design (URL-4)

The wall unit in the image appears as a multifunctional module designed for human-animal common use (Figure 9). The unit in the common living area is an equipment for human-animal common use by incorporating functions such as library, display, play and climbing. The contrast of the rough-hewn natural tree trunk with the smooth white shelves makes an aesthetic contribution to the space design, while creating a natural scratching surface and walking track for the cat living in the house. For the space in the image, it can be said that it constitutes a qualified example of how feline family members can be integrated into a functional and livable space.

Figure 10 LYCS Architecture's design "CATable 2.0" (URL-5)

In the image, there are wooden modules designed by LYCS Architecture, an international company with offices in Singapore, Hong Kong, Beijing, Shanghai, Guangzhou, Shenzhen, Hangzhou, and the winner of many awards in the field of design and architecture (Figure 10). "CATable 2.0", consisting of 4 cubic wooden modules in exactly the same dimensions, is a furniture design designed for both human and animal use. Each module has a specific path with special spaces for cats to roam freely. The "remaining" areas are a flexible design left to be used according to the cat lovers' own needs. It is possible to use these units directly as stools or coffee tables, or to plan them as bookshelves or display units. "CATable 1.0", on the other hand, is the table designed by the same company for animal-human joint use (Figure 11). Designed with cats who want to be close to their owners all the time, the table is a natural and aesthetic design that stands out with its soft lines. As it can be understood from these examples, there are companies that produce for the arrangement of common living spaces. This is when it qualifies as proof that the design of shared living spaces has increasing value.

Figure 11 LYCS Architecture's design "CATable 1.0" (URL-6)

Another example of furniture added to the living area, especially for the use of cats, is the modular system named "Gold Paw" designed by designer Stefan Hofmann (Figure 12). The module, which is designed in multi-pieces with a flexible design approach, has the opportunity to expand by combining it in line with the needs of cat owners. Multi-piece modules integrated into ceiling and wall surfaces in living areas are planned as a fun play and exercise area for cats.

Figure 12 "Gold Paw" designed by Stefan Hofmann (URL-7)

Located in Singapore, this apartment floor was designed by Mr Shopper Studio and planned to create an aesthetic and comfortable space for homeowners and their pet friends (Figure 13). While the wall shelves used in the space create a display area for the homeowner, it is also planned as a climbing and walking area for their pet cats, especially for the transition to the ceiling area designed at low elevation. The ceiling system, which is designed as floating, also allows the formation of a passageway for pets and connects the different walls of the space. In addition, the linear track, which is planned in addition to the ceiling system, acts as a bridge and makes the animal-human common living area enjoyable for pets.

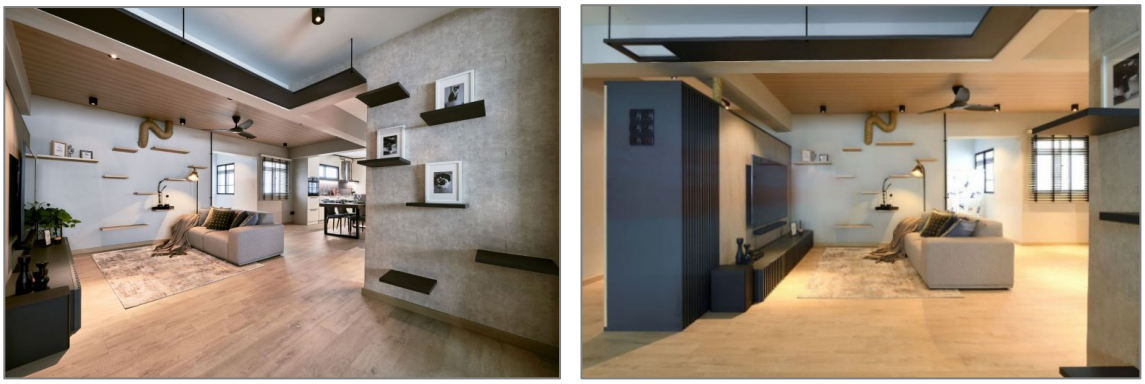


Figure 13 An Apartment designed by Mr Shopper Studio (URL-8)

Another project for the joint planning of living spaces is a small living space for shared use designed by "viaARCHITECTURE" (Figure 14). The housing space organization has been planned for the common use of animals and humans and is supported with details that can only be used by pets. While the passage niches created between the walls allow pets to make secret passages between the rooms, the interior furniture consists of staircase-like details that make it easier to reach these niches (Figure 15).

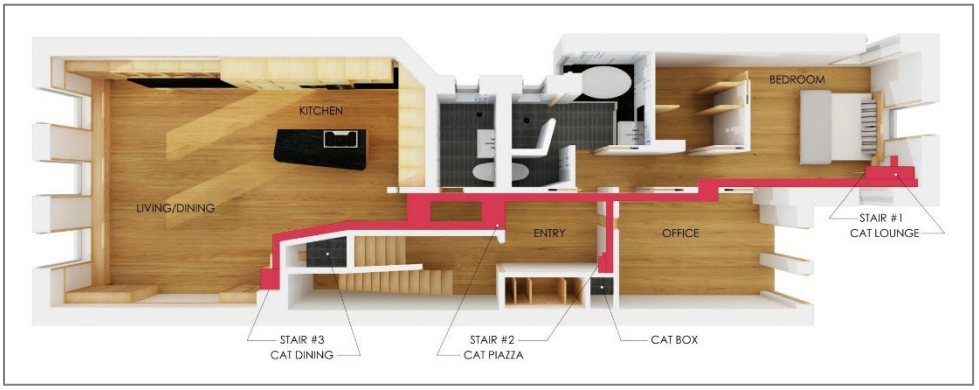


Figure 14 Small living space designed by "viaARCHITECTS" (URL-9)

In the space designed by “viaARCHITECTURE”, spatial organization, material integrity, and functional solutions that come to the fore in the design of small living spaces draw attention and can be defined as a quality space developed for human-animal common use.

Figure 15 Small living space furniture and wall details designed by “viaARCHITECTS” (URL-9)

When the subject of symbiosis with pets is researched, we mostly come across details about living with cats and dogs. Apart from these animals, many examples such as birds, fish, monkeys, rodents can be added. However, the largest sample of symbiosis with animals consists of cats and dogs, which we can express as the animals with the most developed possibilities of living together.

An extraordinary example that we can give outside the common living areas with cats and dogs is the fish tanks added to the space design (Figure 16). In these examples, which were created by organizing transition tanks between different aquariums, the swimming time of the fish was extended and their circulation in the space was ensured. Thus, the freedom area for fish has been expanded and a different detail has emerged in terms of space. Although these tanks, which support eating and drinking spaces aesthetically, seem to create an environment for living together, it can be said that the subject of symbiosis is limited since the interaction of fish and humans is limited or they do not interact as much as a cat / dog.

Figure 16 Common living area created with aquarium and tanks (URL-10)

It is possible to define interior designs planned with a human-animal symbiosis orientation as an innovative approach. In fact, it will be possible for two different creatures with anthropometric differences to live a common life in the same space by providing the comfort conditions, with special solutions included in the space organization. Self-care is the focus of designing a pet-

friendly, well-organized home. Having a clean, orderly and planned life organization for both people and animals will make life together more enjoyable and qualified, while offering special solutions for the care needs of animals. In common living spaces with animals, if the right materials are not chosen and the right organization is not set up, it may be possible for the space to wear out, become disorganized and move away from hygienic conditions. With the right ideas, it will be possible to plan space solutions in our home that meet the self-care needs of pets in a practical way and contribute to animal welfare. In this way, our living standards will increase together with our animal friends, with whom we have established unconditional love, and joint life will become quality.

Undoubtedly, the importance of social media is great in the spread of these innovative animal-friendly living organizations and the issue of living together with animals. The "animal sensitivity" and "animal friendly" approaches that come to the fore in social media have made a significant contribution to keeping the issue up to date. During the research process, the existence of a movement called "barkitecture" and also known as "animal friendly living space design" was discovered in the media and detailed research was conducted on the subject. When the literature on the subject title was searched, it was seen that the term "barkitecture" was not included in the literature. In fact, it can be said that the expression "barkitecture", which is a combination of the English words "bark" and "architecture", is a description for dogs only, not including other animals. Considering the density of interior and furniture design examples of symbiosis with animals, it has been determined that there is a need for an epistemological definition of academic interior design. One of the main aims of our research is to propose a definition of " SYMBIOSIS DESIGN", which expresses symbiotic life with pets, covers all animals, and meets the meaning of the word symbiotic. It is foreseen that this definition will be a top heading that covers space and furniture designs for the common life of pets and people.

5. Result and Discussion

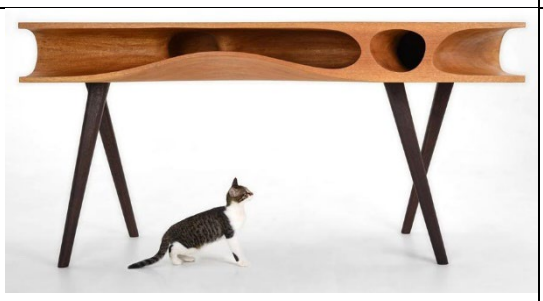
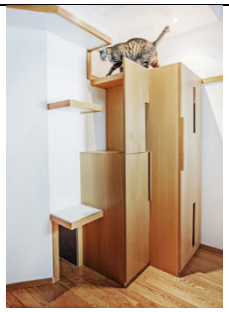
The two-stage methodology applied in the study provided the clarification of the definitions of the concepts inherent in the subject in the first stage. It has been understood that there are differences between the terms derived about the subject. In this respect, it has been understood that the relationship between ergonomics and common living space design are immanent concepts. It can be said that human-centered inclusive architecture concepts come to the fore as human ergonomic features are prioritized in the discipline we are discussing.

In the second stage, the visuals of the existing interior and furniture applications were evaluated by content analysis method in accordance with the theoretical infrastructure. The findings obtained as a result of the content analysis made, it was understood with the extreme examples observed from the findings obtained that the human-animal relationship could not be kept under control in the common living spaces in the post-humanist period. Although the discipline of architecture suggests inclusiveness by stating that all living things have a place in space design, there are very few examples in the field of application that include all living things. This shows that it is necessary to review the human-centered understanding of design disciplines. However, it can be said that architecture that includes people and all other living things is not an optimistic approach defined only through opposites, but remains in the background in terms of importance in the 21st century. The reason for this situation can be shown as the continuation of the effects of the modernism approach, which emerged as a result of the prioritization of human characteristics in the positivist period. In line with the findings, it has been determined that although the architectural practices developed to live together with all living things in the post-humanist society are limited, they have the potential to become widespread.

The table below was created in line with the findings obtained (Table 1). Accordingly, it can be said that the examples can be grouped under two main headings in terms of ease of use and ergonomic compatibility. It has been understood that the furniture samples that can be used by animals are superior in number by prioritizing human needs. However, it should not be forgotten that these examples may have been created with marketing concerns in line with the findings

obtained. The reason for this thought is that the designed furniture ignores the ergonomic features of animals. However, in the understanding of symbiosis, harmony should be balanced in terms of animal and human use. It can be said that commercial concerns are at the forefront in designs made by accepting the superiority of a living thing. However, it has been concluded that the furniture used only for animals is insufficient in terms of function. Although the reasons for the purchase of furniture produced only for animal needs by human users for the space are not understood, it can be predicted that such furniture will not have a long-lasting use.

Table 1 Human-animal use, space-item relationship (created by authors)

	In terms of use and ergonomic fit	
In terms of interior organization	Human + animal common use	Animal use
Additional space element (Movable furniture)		
Fixed space element (Fixed Architecture Application)		

When the table is examined in terms of indoor organization, it is seen that fixed architectural practices are a kind of reinterpretation of existing elements, especially in terms of human-animal common use. In this case, it can be said that such applications, which can be described as adaptation design, are similar in terms of content, although they are becoming more widespread, and therefore they have lost their originality. It can be said that adaptation practices, which can be described as repetitions of each other, are based on the assumption that human animal users have an intertwined lifestyle in the same space. However, the extent to which this situation corresponds in real life is open to debate. Fixed architectural applications, which are defined as space additions in terms of indoor applications, have a much more original quality than adaptation examples, which are developed only for animal use. Although such examples are few in number, it can be said that there are promising applications in terms of design approach and original value. In this context, it can be said that the understanding of design in spaces defined as communal spaces should be based on space design rather than furniture production. Furniture designed according to the anthropometric measurements of human users, which are prioritized by commercial concerns in terms of use and ergonomic features, would be appropriate for animals to be reconsidered by using a new scale from a different perspective. In this case, it would be a good decision for designers to produce with the help of disciplines dealing with animals.

Until recently, the only option we would make of making our homes pet-friendly spaces was a scratching post, sleeping pad…etc from a pet store. it could be buying furnishings or adding a cat/dog wing to an outdoor door. However, especially with the pandemic process, the experience of living together with pets has increased, and in this direction, special architectural solutions have been started to be developed for the four-legged members of our family. These details appear as

special solutions that can be added to the fixed/moving furniture we use for our pets, to design furniture that fully functions for human-animal use, or to integrate into the interior design.

As a result, in the research conducted on the subject in line with the findings obtained, it was determined that the applications examined within the research were limited, the existing studies had methodological and theoretical deficiencies, and the subject needed to be developed in terms of the literature. However, it has been understood that the 'interior and furniture design for pets' approach is a design concept that is open to development and is preferred by users, manufacturers and designers. In addition, it has been observed that the findings obtained are mainly single furniture or space applications, the evaluation is made on examples from abroad, and the examples of local specific space and furniture applications are quite limited. It can be said that future research on the subject should be developed methodologically and theoretically, and the literature should be enriched.

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Resume

Neşe Başak Yurttaş is an Assistant Professor at the Department of Interior Architecture and Environmental Design at Biruni University. Dr. Yurttaş is an interior architect and received her Ph.D. from Mimar Sinan Fine Arts University in the field of Interior Architecture. Before becoming an academician, she had worked for 19 years as a senior interior architect in many international companies. She is currently conducting interior architecture design studio courses for undergraduate students. She has focused her research mostly on themed spaces, spatial identity, inclusive design and architectural design education.

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Spatial habits in residential kitchens and the searches for flexibility in kitchen design

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Abstract

While rising urban populations, as a result of industrialization, narrowed the buildable areas in cities, at the same time the World Wars I and II increased the demand for housing. In addition, the change of social dynamics and production models and the development of technology have also been influential in the search for flexibility. Flexibility, which can be considered in many ways, is examined in this article with the space organization, equipment/outfit and time in kitchen design. At this point, the research aims to measure user-specific expectations about flexibility in kitchens design. A survey was proposed in the study, considering that the determination of spatial habits in the kitchen is determinative in terms of which parameters should be taken into account in flexibility. The aforementioned survey was applied to people between the ages of 25 and 40 who live in apartments in Istanbul and work overtime. The survey has revealed that spatial habits in the kitchen vary with the square-meter of houses and their organization scheme according to it. For example, in 1+1 and studio apartments, the connection of the kitchen with daily life is stronger, however there are difficulties in use in terms of equipment and spatial organization. On the other hand, in relatively larger residences, it was seen that not preferring to spend time in the kitchen is due to the fact that the psycho-social requirements of the functional and flexibility of the kitchens were ignored during the building production process. In the study, it is argued that while it is possible to develop more creative and multifunctional kitchen solutions in changing square-meters, it is due to the imitation of the same plan templates of build-and-sell managerships in the apartment building process in big cities.

Keywords: flexibility, functionality, kitchen design, spatial habits, working population

1. Introduction

Technological and social changes have a transformative effect on users through spaces. Like all designed spaces, residences are like an envelope that cover the production styles and fashions of the period. To put it more clearly, spaces convey the life and production styles to the users of that period through forms and volumes (Lefebvre, 2012). Since the Industrial Revolution, traditional kitchens around the world have been replaced by mobile, functional and flexible kitchen solutions with the change in building design and social norms (Cömert, 2017). The change of interior space paradigms as a result of industrialization paved the way for the traditional kitchen types to be erased from urban life. The gradual shrinking of residential square meters as a result of the sudden increase in urban populations necessitated the reinterpretation of eating/food preparation spaces, as in other parts of houses. The first half of modernism promised standard and mass-produced spaces, based on the fact that functional and everyone's kitchen needs are basically the same. Le Corbusier, one of his contemporaries, likened the house to a living machine and stated that the functions of the house were universal. In this sense, the first modern architects were in search of an egalitarian order, regardless of the scale, that wanted the working class to live under

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comfortable conditions (Uyar, 2014). This understanding, solving as many functions as possible in small square meters and observing the diversity of use have formed the first criteria of flexibility.

The kitchen is one of the most intricate parts of the house with its three main functions that can be defined as the triangle of "cooking, storage, and cleaning" and the living practices brought by socio-cultural dynamics. While the social structure, food culture, economy, technology, design acceptances and fashions shape the kitchen image of the period, the user of the kitchen, as the last parameters, customizes the mentioned volume (Geçgin, 2021). Therefore, the kitchen experience varies from user to user. Due to the difficulties of today's city life, the importance of functionality in kitchens in human life is increasing. In our country, Turkey, where lifestyles vary from region to region, it is inevitable that residential kitchens will differ in terms of both size and functional solutions (Serinkaya, 2022). For example, it cannot be thought that the life cycle of the kitchen of a summer residence far from the rhythm of the city and the kitchen of a worker living in an apartment and working full-time are designed with the same actions. Today, it has been determined that people want to spend less time in the kitchen and devote their time to other activities (Leppänen, Jokkinen, 2003). Looking at this reference with a focus on the working population, it can be concluded that the expectation for a flexible kitchen, which is suitable for the hasty rhythm of the city and where many functions can be seen together other than kitchen functions, outweighs. In the kitchen, which is defined as a habitus, it is important to examine the speed of work and flexibility criteria.

The aim of the study is to analyse the expectations in terms of flexibility and volume in kitchens with narrow volumes and to analyse whether residential kitchens designed with the principle of flexibility meet these expectations. After briefly mentioning how flexible kitchens have evolved with capitalist production models from the beginning of modernism to the present, it was investigated whether the design inputs of various sample kitchens solved in narrow volumes are covered by the criteria established in the study. In order to find these criteria, in the methodology, a survey study was proposed in which the spatial habits and adaptations of the users in the kitchen are examined. Hoping that the results of the survey would match the conceptual infrastructure and hypothesis, what users expect from residential kitchens and their spatial habits and expectations in the kitchen were measured. Survey answers were reviewed within the context of flexibility approaches and a complete of information was created to provide recommendations for the current situation.

2. A glance to the concept of flexibility in interior architectural scale & determining flexibility criteria

The Industrial Revolution is regarded as the main factor of growth of modern cities and shrinkage of residential areas. As people migrated to cities and the new working class began to form in metropolises, areas of housing got shrunk. Thus, designers had to find multifunctional solutions for narrow apartment flats. Beside the Industrialization, World Wars I and II increased the demand for housing and efforts for design flexibility. In this sense, dynamics of modernist paradigm required mass and monotype production model. (Sariyar & Pakdil, 2012). Schütte-Lihotzky's famous proposal, Frankfurt Kitchen can be handled by both equipment and spatial organization level in this context considering women in the working class. It's possible to say that early phases of flexibility and multi-functionality searches could find reciprocation with only socio-economic classes and gender norms (Surmann, 2017). After this period, development of individualization and production techniques, the post-modern face of capitalism (mass customization) has included the image of the product in the consumption culture as the primary reason for purchasing the product (Sarıyar & Pakdil, 2012; Lefebvre, 2012). As individual requests have been taken into account more than before, the user's savings on space have increased. The user's ability to adapt the space according to himself is another important reason that paves the way for the increase in flexibility and diversity in kitchen designs (Hatipler, 2017). The socio-economic class-based roles assigned to individuals by the modern age have increased the differences between each other's living spaces and spatial habits. Although the lifestyle and desires of the user are taken into account in the principle of

flexibility, mass housing in Turkey forces individuals to live in similarly planned spaces. It is understood that the search for flexibility in kitchen design, which is the scope of the study, is one of the results of the shrinkage of residential square meters as a result of population growth and the change in lifestyles, and this current situation requires rethinking of user-specific and compact kitchen solutions in the house. In the event, the concept of flexibility has become both a need and a quality offered to the public as a result of individualization.

While the flexibility is based on variability, it can also be expressed as the ability to adapt and the ability to meet changing requirements with minimum effort (Atasoy, 1973). Flexibility, which is a twentieth century problem, has been handled from different perspectives by theorists and various definitions of flexibility have been made (Uzel, 2001): Kami and Friedman defined flexibility as the ability to adapt to new situations and needs. (Friedman, 1990; Kami, 1995) They emphasized that as the number of people using the space and the functions of the space change over time, the whole of the relations in the space can be re-established. In this sense, the concept of flexibility they talk about affects the whole plan and the functional scheme. The user's ability to adapt the space according to his own needs is one of the important criteria of flexibility. Flexible space should allow the reorganization of its organizational chart (Bayram, 2011). Ok (1985), with a much more radical stance than Friedman and Kami, saw flexibility in the building design process as the ability to function spaces as desired by the user (Tapan, 1972) mentioned flexibility as the ability of the same unit to respond to different user needs and to benefit from the same volume for more than one function without touching the structure. Solving multi-functions in narrow spaces is a form of flexibility that can be presented on the basis of equipment and details. These decisions, which can be taken at the scale of interior design, will be discussed separately within the scope of the study. In the light of these references, flexibility is a criterion for adapting a volume to the life of the user, both at the level of equipment and at the level of space partitioning. For the study, as seen in Figure 1, the flexibility criteria were determined by examining the spatial organizations and kitchens of some designers' famous buildings.

the designer's name	the building	the approach	the kitchen proposal
Bruce Price	Fun Place	multi-functional use of space	several functions beside storage, cleaning, and cooking
Le Corbusier	Villa Savoye	free plan and border flexibility	organic relation with circulation axis
Gerrit Rietvelt	The Schröder House	changing interior volumes with movable panels	integration between dining, living space, and kitchen
Can Çinici	Mikro-Loft Yarasa	fluid plan diagrams	mobilization of kitchen in house

Figure 1 Flexibility approaches and kitchen interpretations in the sample buildings of the designers (Barışık, 2019; Asımgil & Durmuş, 2021).

The approaches in the table (Figure 1) are seen as multi-functionality, boundary-span plan types, freedom in spatial segmentation and fluid function diagrams. For this approaches, detail solutions in interior architectural scale is of great importance. It is hoped that the kitchen design approaches indicated in the table will form an evaluation base for the kitchens of the users in the survey. In this way, it is thought that with the help of the proposed survey, the design examples presented to the users around the world can be thought about whether they are suitable for the lifestyle of the users in the city life. The concept of flexibility can be found in many scales. However, in this study, the search for flexibility in kitchen design should be examined under the sub-title of flexibility in the housing unit.

2.1. Flexibility in spatial organization and spatial segmentation level

It is a fact that has been revealed before today that completely open and fluid space solutions in residential designs are not comfortable for the general public in terms of privacy (Alexander, 1977). However, many users are positive about the idea of partitioning the house without requiring an expert. In order for the users to easily separate and use the space, it is important that the dividing elements can be produced with a certain standardization, that they do not need plaster, coating, finishing work items, that they can be easily changed and that they can be produced in a variety that will appeal to the aesthetic perception of the user (Ayaydın & Deniz, 1995). When it comes to the kitchen design, although kitchens are generally located close to the vertical installation axes in the apartments the connection between kitchens and other parts of the house can be reorganized by user's own decision as can be seen in Figure 2.

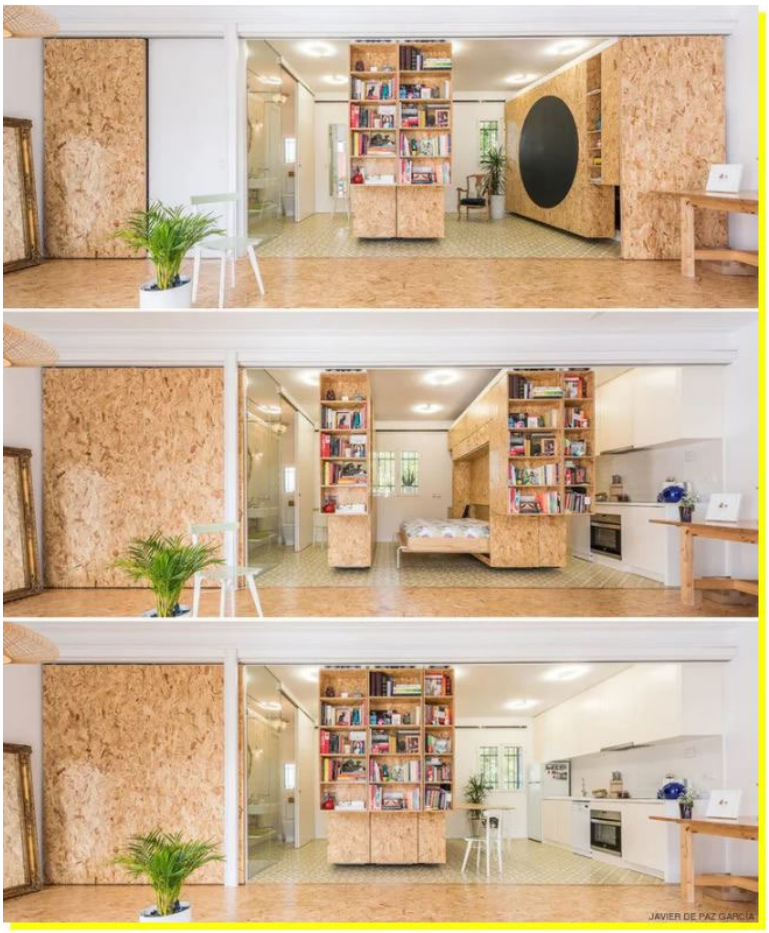

Figure 2 Movable wall solution by Madrid based architectural studio PKMN-Architectures, photographed by Javier de Paz Garcia (Huffpost, 2015).

Partial or complete integration of kitchens with living spaces has been popular around the world since the 1950s as Le Corbusier designed Unité d'habitation in Marseilles in 1952 (Figure 3; Le Corbuiser World Heritage, 2019). Its popularization in Turkey dates back to the 80s-90s. With the accelerating westernization on the cultural axis and women becoming more visible to the business world, their role in the kitchen has become more shared with the other members of the house than before (Güler, 2007). As a matter of fact, the open kitchen invites other members of the house to the kitchen with its volumetric connection with the living space. At the same time, it's a necessity that user must be able to block dirty or mechanical view of kitchen areas. This freedom is found necessary to be given by designers (the change shown in Figures 4 - 5). The kitchen started to connect with the living space somehow, coming out of the four walls; It has become not only a place to eat, but also a showcase where the owner wants to express his aesthetic understanding and lifestyle (Uyar, 2014).

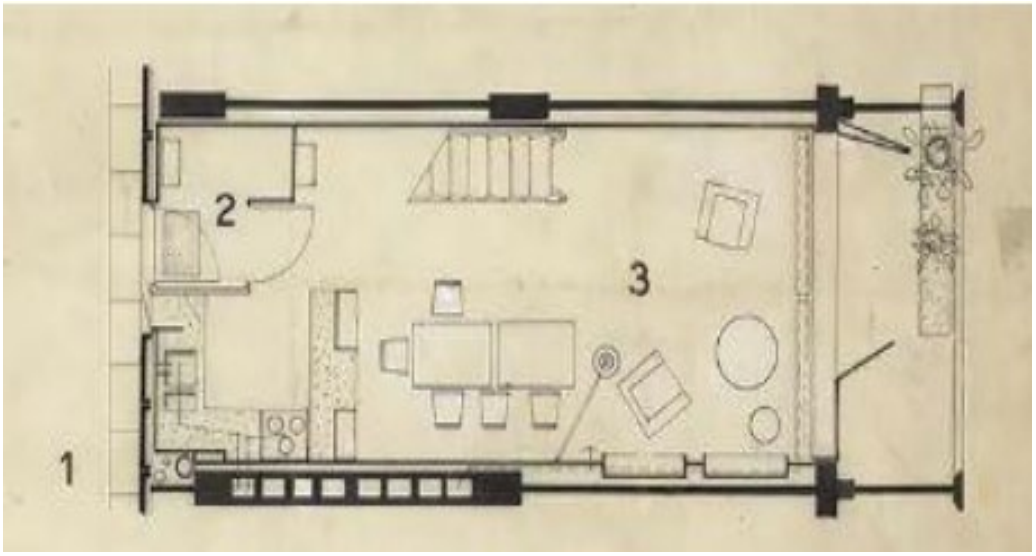

Figure 3 Plan of flat types in Le Corbusier's residence project called Unité d'habitation in Marseilles (Le Corbusier World Heritage, 2019).

Figures 4 (left) and 5 (right) Change in the visibility of the kitchen volume with the partitioning elements in Can Çinici's Micro Loft Bat House (Barışık, 2019).

2.2. Flexibility in equipment level

Although the kitchen has undergone a long evolution to date with social, economic and technological changes, the three main functions – storage, cleaning, cooking – have remained constant. With the shrinking of houses and the emergence of new housing definitions such as tiny-house and micro-house, it has become important to try to solve as many functions as possible in small spaces with interventions at the level of equipment in the kitchen as examplified with smart systems seen in Figure 7 and 8. Today, with the development of software (Arduino) and the internet, this effort has gained a new dimension (Ekren & Küçük, 2020, Figure 6). It can be said that inventory tracking and time savings achieved by seeing more functions in the unit work area have also become a criterion of functional flexibility. Smart surfaces, examples of which are shown in Figures 6, 7 and 8 allow more effective use of a narrow square meter by reducing the distances in the storage-cleaning-cooking triangle. Examples of the flexibility of the surface reinforcement are the use of the sink, which is closed with a sensor on the far left, as a food preparation, cutting and

chopping area (Figure 8), or the rightmost counter turning into a stove when cooking, or turning into a surface for working or eating otherwise (Figure 7).

Figure 6 Smart surface technology which identifies ingredients of meals (IDEO, 2015).

Figure 7 Lapitec Induction System designed by Lapitec S.p.A. (German Design Award, 2017).

Figure 8 Invisible Sink designed by Offmat Kitchen Concept (Business Insider, 2016).

Multi-functionality in the kitchen is useful as long as the user's movements in the kitchen are not restricted. Therefore, ergonomic principles and the rule of kitchen work triangle is recommended to be followed (Figure 11). This rule is based on the circumference of the cooking-cleaning-preparation triangle should not exceed 7.9m and be less than 4m for an ergonomic space experience (Mihalache, Møretrø, Borda, Dimitraşcu & Neagu, 2021). However, in living areas where cooking is not intensive, these standards can be stretched or mobilized such as the vertical kitchen proposal by Facchinetti Partners (Figure 9). The examples in Figures 9 and Hafele's rotated cellar (Figure 10) are space-saving solutions, with the modular reinterpretation of the storage-cleaning-cooking triangle in the vertical plane, whose effect is felt mostly in three dimensions. Parts moving in the vertical plane can provide convenience both in terms of disabled accessibility and anthropometric measurements that vary from geography to geography (Figure 11).

Figure 9 Facchinetti Partner's vertical kitchen (Facchinetti Partners, 2013).

Figure 10 Hafele's rotated cellar (Uyar, 2014).

Figure 11 Vertically moveable kitchen units (India Mart, 2018).

A la Carte kitchen modules (Figure 12 - 13) where the storage- cooking - cleaning triangle can be rearranged at the initiative of the user, is an example of a solution that meets the psychosocial and functional needs of the user in terms of both space organization and equipment. This organization method can also be applied in office areas.

Figure 12 (left) & 13 (right) A la Carte Kitchen by Stadtnomaden (Architonic, 2014).

2.3. The concept of flexibility and time

In order for flexibility in design to be sustainable, it must adapt to the conditions of the passing time. This time frame may vary according to the planned process. In flexible houses, a change can be observed in the long term according to the increasing and decreasing population in the residential household, and the change in the organization of the space during the periods of the day can be a desired flexibility criterion. French sociologist and writer Georges Perec states that functionality is followed by the nictomeral (24 hours) period in the partition of today's apartments. He draws attention to the fact that the functions in the house correspond to certain time periods of the day. In this way, he reads the functions of house partitions by the concept of time (Perec, 2017, p.50). Taking this criterion into consideration in the survey proposed in the study, it was desired to measure the time periods the users spent in the kitchen and what they did during this time. Chaillou's interpretation of time flexibility in design is explained in Figure 14 as follows. Chaillou explains: “When employees and visitors start to arrive in the morning hours, the units are arranged in a grid manner, while individual and co-working spaces are gathered in the center on the upper floors; the kitchen and rest areas recede and disappear.” (Asımgil & Durmuş, 2021).

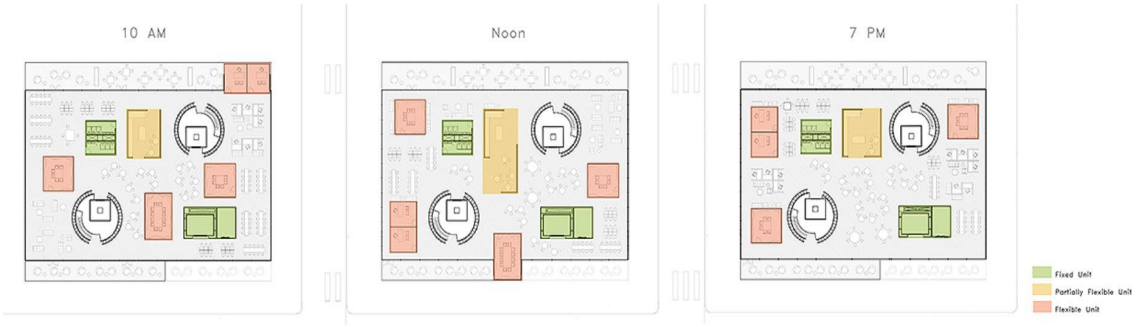

Figure 14 Plan diagram from Chaillou's project Metabolism (S), inspired by the Nakagin Capsule Tower (Archdaily, McManus, 2018).

3. Research Method

After examining the flexibility criteria, a questionnaire was proposed to measure the users' relationship with the kitchen and their expectations in kitchen design in the context of flexibility. For the quality of the research, it is necessary to limit the user profile, because the life routines of the users, even the kitchen schemes and user habits may vary depending on whether the house is in the city or rural area. For these reasons, the population of the study was defined as white-collar workers aged 25-40 living alone in flats in Istanbul. The main reason for choosing this group is that the cooking routine in the kitchen is not stable due to their disconnected relationship with the kitchen, their income group and long working hours. A questionnaire consisting of questions that will measure their routines in the kitchen and reveal their expectations from the kitchens they own/want to be was made to the users. “IS FLEXIBILITY A NEED?” It was expected to be an answer

for the basic research question that can be defined as. The survey questions aimed to reveal 3 basic relationships:

1. House and Kitchen Space Relationship
2. The Relationship Between Kitchen Area, Its Equipments, and Spatial Habits that they All Define
3. The Relationship Between Flexibility, Multifunctionality and Satisfication

Since the awareness of the survey participants about the places can be variable, thus closed-ended questions were asked in addition to the open-ended questions. Closed-ended questions have answer options such as estimated time intervals and plan template to make easier to respond questions. The questions asked in the survey are as follows:

Open Ended Questions

- How many squares is your residence you live?
- Do you enjoy spending time in the kitchen? If not, state the reasons.
- Do you have another activities while preparing or eating your meals in kitchen? What are they if your answer is yes?
- Do you find your kitchen useful? If yes, state the qualifications; if no, specify the dissatisfying features.
- Do you find your kitchen suitable for working? Or do you prefer to work in your kitchen?

Closed Ended Questions

- Choose your kitchen's plan type according to templates below.
- Choose your estimated time interval of staying in kitchen during working days.
- Choose your estimated time interval of staying in kitchen during your off days.
- How many days a week do you prepare meals in kitchen? Choose your time interval from below.
- How often do you use ready-to-eat applications when you're at home. Choose your frequency below.
- I work remotely. Choose yes, or no.

4. Findings

The findings were obtained as a result of comparing the answers in the questionnaire witheach other. The survey begins by questioning the area of the dwelling that is occupied first. Assuming that the users cannot know the area of the kitchen directly, the estimated area of the kitchen has been tried to be estimated in direct proportion to the area of the residence. From the sketches marked for the plans of the kitchens, it provides an idea about what types of kitchen setups we are faced with according to the square meter of the house. The plan type of the kitchen instills certain habits within the potential of the user of the space.

4.1. Relationship between organization of residence and kitchen

According to the responses from 50 subjects, there is no dramatic clustering in residential areas. A significant part of the subjects reside in houses between 80 and 120 m2. In order to determine the spatial habits developed according to the quantitative characteristics of the kitchens, the distribution of the residential square meters according to the people is important. For this, information about the types of kitchens as well as the areas of the houses they reside in were obtained from the users (Figure 15).

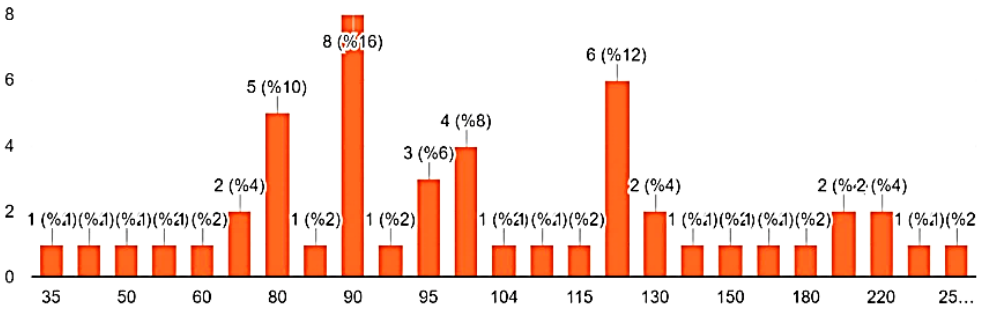

Figure 15 Distribution of residential square meters by persons (Question: How many square meters is your residence?)

Types I and L in the kitchen are the two most preferred kitchen types by 39 subjects. The striking point is that these types are widely used in every kitchen type between 40 and 250m2. While it is possible to develop more original kitchen solutions in changing square meters, it can be said that this uniformity is caused by the build-and-sell management that became widespread after 1965 in the apartment building process in big cities, reducing the effectiveness of the designer and imitating the same plan types (Görgülü, 2016). Considering this situation, it is seen that most of the users cannot choose their kitchen types beforehand. H-type, which consists of two parallel counters, is a kind of repetition of I-type and 5 subjects use this type of kitchen. The user with an area of 35 m2 marked the kitchen sketch as G type. The G-type counter may have been preferred in this flat, in a residence with a narrow space, in order to limit the projection of the kitchen without a divider. Island type kitchen use (marked by 2 subjects) could be seen after 145m2 in the questionnaire (Figure 15 – Table 1).

Table 1 Distribution of subjects according to residential kitchen plan type

QUESTION: Choose your kitchen plan type from determined samples.		
Plan Type	**Number of Users**	**Percentage**
Type I	23	46%
Type L	16	32%
Type H	5	10%
Type U	3	6%
Type G	1	2%
Island Kitchen	2	4%

4.2. The relationship between area of kitchen, its equipments, and spatial habits including

After obtaining information about the housing area and kitchen type from the subjects, the kitchen experiences of the users, the quality of the time they spent in the kitchen and their satisfaction were examined. For this, the subjects were asked to indicate the time intervals they spent in the kitchen when they first worked and when they were not working.

On working days, 90% of the employees (45 people) spend 1-3 hours in the kitchen. Distribution shows heterogeneity in terms of housing area. Two subjects with a residential area of 145 and 200 m2 exceptionally spend more than 5 hours and 6% (3 people) people spend time relatively less than the 5+ group. The spatial habits of these 5 users will also be examined in terms of the time they spend in the kitchen. The rate of spending 1-3 hours in the kitchen on non-workdays decreased to 66% (33 people). While the number of people staying in the kitchen for 4-6 hours in houses under 100 m2 is 8, this number is 9 over 100 m^2 (Figure 15, Table 2). Compared to the previous question, it can be concluded that the kitchen is a place that is actively used and spent time outside of working days, and as the housing volume grows, the time spent in the kitchen increases. Exceptionally, the user, who has a residential area of 55 m2, stated that he spends more than 8 hours in the kitchen on the days he does not go to work. This situation has shown that the kitchen can be an area that can be integrated into daily life in houses with narrow spaces. The frequency of food preparation, which is the main activity of the kitchen, is as follows: Those who prepare meals every day: 5 people (10%) /Those who prepare meals 4-5 days a week: 9 people (18%)/ Those who prepare meals 5-6 days a week: 2 people (4%)/ Those who prepare meals less than 3 days a week: 34 (68%) (Table 2).

Table 2 Distribution of subjects according to time interval while spending time in kitchens.

QUESTION: How much time do you spend time during workdays and off days?		
TIME SPENT IN KITCHEN	**WORKING DAYS (by persons)**	**OFF DAYS (by persons)**
1-3	45 (90%)	34 (68%)
3-5	3(6%)	15(30%)
5+	2(4%)	1(2%)

The development of information technologies has had a transformative role in eating habits around the world, and the market has developed in parallel with the development of the internet since the beginning of the twentieth-first century (Tomaş, 2015). Although there is no direct study on how online food ordering platforms affect kitchen experiences, there are opinions that virtual platforms reduce the need for physical spaces. These inferences refer to David Harvey's concept of time-space compression (Yılmaz, 2018). Ready meal applications are widely used in almost all working adult groups. Based on the results of the survey, 74% (37) of the subjects continue their food preparation habits in the kitchen continuously or partially.

Table 3 Frequency of use of ready-to-eat applications by persons

QUESTION: How often do you use ready-to-eat applications in your off days?		
Use Frequency	**Number of People**	**Percentage**
Almost every day and every meal	1	2%
Very often	12	24%
Intermittently	23	46%
Rarely	11	22%
Never	3	6%

4.3. The relationship between flexibility, multi-functionality and usage satisfaction

The questions asked about kitchen satisfaction were chosen to measure whether the flexibility expectations of the participants in the kitchen volume and equipment level were met. Satisfaction is an indicator to be functional and preferable for daily activities in the kitchen. Here's how to enjoy spending time:

Number of people who enjoy spending time in kitchen	14 (28%)
Number of people who enjoy spending time in kitchen but state some problems	7 (14%)
Number of people who do not enjoy spending time in kitchen	29 (58%)

Among the reasons for not having fun, there are usually reasons such as fatigue, workload, not knowing/not enjoying cooking. In addition, one person reported that he did not like the finishing material (the color of the countertop) that his kitchen had, and that this affected his kitchen experience (Table 4). This situations like this have been analyzed in another studies under the sub-title of psychological needs of flexibility (Uzel, 2001). According to the comment of one of the subjects, who stated that he could not enjoy the time he spent in the kitchen because the kitchen is not tidy, the necessity of keeping the kitchen clean and the items used in the kitchen inconspicuous evokes the expectation of flexibility in design and increase in storage area.

It has been observed that the use of the kitchen for functions such as spending a leisure time, socializing and working is quite limited. From the answers given, it is understood that the functional flexibility in the use of the kitchen is more limited (33%) in the houses with 35 to 80 m2 compared to the larger houses. While the ratio of 80-100 m2 range, which is the most common residential area among the subjects, is 11%, while this rate is 46% in houses between 100 and 250 m2. This apparent limitation in the range of 80-100 m2 shows that the kitchen cannot be adequately organized in the house and is not suitable for other functions (Figure 15, Table 4). Users with this space range complain that their kitchens are narrow (generally I and L-planned) and that their storage areas are insufficient (Table 1- 4). While questioning the usefulness of the kitchen, it was tried to measure whether the kitchens they owned met the criteria related to flexibility, psycho-social, functional, equipment and spatial organization. The most important problems of the subjects in kitchen solutions are that they find their kitchens narrow and they see insufficient space for storage. The narrowness of the kitchen both psychologically distracts the users from spending time in the kitchen and reduces the comfort of the space functionally. The inadequacy of the storage capacity (16 people) and the incompatibility of the storage-cleaning-cooking triangle that forms the organizational chart of the kitchen (5 people) appear as a flexibility problem at the equipment level (Table 4).

The desire to use the kitchen area for other things when necessary or to have compact systems that take up less space (2 people at the rate of 4%) demands a right of disposal in terms of space partitioning and space organization. The housing experiences of the subjects who work from home and those who work outside the home differ from each other. The rate of 12 people working remotely using the kitchen as a working area is 4% (Table 4).

Table 4 Distribution of users according to their satisfaction with their kitchens and reasons for dissatisfaction

QUESTION: Do you find your kitchen useful? Why if not?		
Satisfaction Status	**Number of People**	**Percentage**
I find it useful in every aspect and it has enough storage area.	26	52%
I find my kitchen narrow, and its storage area is inadequate.	16	32%
My kitchen equipments and furnishings are not suitable for my body size.	2	4%
Plan organization of my kitchen is problematic.	5	10%
I don't spend much time in kitchen, so I would like to use this area in another functions if it was possible.	1	2%

It could not be determined that the enjoyment that the subjects took from the time they spent in the kitchen overlapped with the kitchen areas or plan types. Subjects with a wide range of fields usually spend time on social media platforms while preparing/eating food in the kitchen, watching television or consuming media products such as TV series, movies, videos, music and podcasts via the internet. It has been revealed from open-ended answers and shown in a reduced way as in Table 5.

Table 5 Usage status of the kitchen area other than cooking and eating activities

QUESTION: Do you use your kitchen other than eating and preparing meal?		
Use status	**Number of People**	**Percentage**
Yes	15	30%
No	35	70%

In the investigation on the kitchen usage habits of remote workers, only 5 out of 12 remote workers use the kitchen for food preparation and non-meal activities. When separated by residence areas, the use of the kitchen by people residing under 100 square meters, excluding food activities, is 28% (2 out of 7 people). This rate is 60% (3 people out of 5) for the people residing over 100 square meters. In larger residences, it is possible to say that the kitchen serves more activities and is used for more activities (Table 1-4 - 6).

Table 6 Distribution of users who work remotely and in a workplace.

QUESTION: Do you work remotely?		
Work Status	**Number of People**	**Percentage**
I work remotely	12	24%
I work in a workplace	38	76%

5. Conclusion

Based on the survey data, it is clear that users expect flexibility in terms of functional, psycho-social and organizational aspects from their kitchens. However, as discussed in the findings, the fact that the kitchen practice in the house cannot vary much according to the plan features limits the functional diversity and comfort of many residential kitchens. According to the average, kitchens can be open to multi-purpose and social uses, since the kitchen volume is more integrated with the living spaces in narrow-spaced houses. People who work remotely can also use these areas to work. However, flexibility solutions at the hardware level should be considered in terms of privacy shown to hide smell or clutter that emerges as a psychosocial problem. It should also be taken into account that the users suffer from the lack of storage space and the ergonomic problems of the kitchens.

Ergonomic problems should be overcome with modular systems that can be positioned in the vertical plane according to the body size of the person. The subjects were mostly clustered between 80-100 m2. In houses with more than one room, keeping the kitchens narrow in order to keep the room areas wide affects the comfort and effective use of the kitchens. As a self-criticism, it is thought that it is necessary to ask how much the respondents consider the kitchen area in their housing preferences. However, in the context of Istanbul, it is important that the efficiency of the designer and owner in housing design is not sufficient and accordingly, the right of disposition should be increased in this regard.

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Resume

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Interpreting living urban-industrial heritage: The Jewellery Quarter, Birmingham

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Abstract

In light of the studies related to the theory of interpretation of cultural heritage sites, the holistic interpretation approach of heritage areas has developed, and a new interpretation culture has emerged. It includes new approaches, local and regional interpretation strategies, new policies and comprehensive analysis and evaluations. The new interpretation culture is important not only to produce interpretation themes, but also to the transfer and sustainability of the values of heritage sites that need to be preserved to the society. In this context, studies are being brought up in order to find the most appropriate ways to understand and transfer living urban heritage sites; tangible and intangible values, existing or non-existent urban structures, ongoing or non-existent social and cultural practices, used or ongoing structures and all cultural and historical layers of areas. Beyond the current interpretation studies carried out for the heritage sites, it is important to develop interpretation strategies including the historical importance of the areas for living urban heritage sites and therefore complex cultural heritage areas, the connections to the places, cultural and social relations networks, urban memory, and the spirit of the place. For this purpose, the study focuses primarily on the critical viewpoint of theoretical content of the interpretation of cultural heritage sites. In the light of theoretical and practical knowledge, the research then concentrates on key themes and discussions on heritage interpretation in the UK. Accordingly, the research discusses the interpretation strategies in the Jewellery Quarter, Birmingham which is the one of the most influential areas by means of historical urban-industrial heritage site.

Keywords: heritage interpretation, interpretation theory, Jewellery Quarter, Birmingham.

1. Introduction

From the mid-19th century onwards, interpretation as a concept has evolved from gaining knowledge on nature via interpreters to a key activity to have consciousness for heritage places by structured interpretation programs. Early attempts of interpretation were developed in Europe and the United States respectively to realize the aspects of the heritage and transferring the knowledge through site visiting, establishing museums and exhibitions. Thomas Coglan Horsfall, a British schoolteacher and follower of John Ruskin, can be accepted as an early interpreter who had conducted site visits for Manchester schoolchildren into the surrounding countryside (Uzzell, 1989, 2). Additionally, Artur Hazelius, who created the Nordiska Museum in Stockholm in 1886 and the first open-air museum at Skansen in 1891, is also cited as the pioneer of interpreters in the Europe (Phillips, 1989). Uzzell (1989) reminds that "stimulated by the Great Exhibitions in London and Paris earlier in the nineteenth century, it was the Scandinavian open-air museums which inspired the establishment of reconstructed Colonial Williamsburg and its progeny throughout the rest of the world" (Uzzell, 1989, 2).

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Parallel to these attempts, US national parks, founded in 1916, worked on the issue of interpretation in order to "conserve not only some of the most beautiful places in the world, but places which had a national cultural and ideological significance" (Runte, 1979; also cited in Uzzell, 1989, 2). John Muir, Enos Mills, and Charles M. Goethe were important people in interpreting the history of the United States. They both helped to save many wildlife areas in the United States and published many written documents for interpreting the nature. The studies of Charles M. Goethe made a difference in interpretation studies with the idea of Nature Guide to the America after making several visits to Europe and observation of their interpretation efforts (Goethe, 1960).

It is seen from the early attempts of interpretation studies that the knowledge and practices on interpretation were transferred and/or interacted within and between the continents. Overall, the mission of the National Park Service, U.S. Department of the Interior focusing the roles of interpreters on the interpretation of "the value of preserving park resources by helping audiences discover the meanings and significance associated with those resources" (NPS, 2007, 1).

In 1957, Freeman Tilden put forward original insights for the main theories and principles of interpretation for the first time. Besides its first emphasis on the principles of interpretation, one of the main inputs of his work was put more emphasis on the power of interpretation in the education especially for children, having the origin of knowledge (Tilden, 1957). It is obviously taken into consideration that, through interpretation understanding, appreciation, and protection of natural and cultural heritage can be realized by stimulating each other.

Accordingly, interpretation literature and practice has been growing in time and defining the importance of holistic understanding of heritage sites. Under the current developments in heritage interpretation, the concept has spread from single heritage sites into the combination of various scales and types of heritage. Recently, parallel to the scope of the interpretation, interdisciplinary studies have been discussed and developed in urban heritage sites in order to find the most suitable ways to understand and express the knowledge of the visible or in-visible values, existing or non-existing structures, continuing or not-continuing social and cultural practices and principles, used or un-used buildings, open spaces and areas, historical importance of the areas, linked narratives and memories in relation to the spaces, changed or un-changed fundamentals and formation principles of the area and overall networks of an urban heritage site.

This holistic understanding of heritage sites has been created to develop new bodies, local and regional level conservation trusts, new policies, and comprehensive assessment methods, creating a new interpretation culture. Recent interpretation culture consists of on-site and off-site studies carried out by different disciplines and related bodies in order not only to generate interpretation themes but also for the sustainability of the heritage sites.

Gaining and transferring knowledge through the interpretation to provide consciousness of values of the heritage sites is accepted as one of the key components of sustaining urban heritage sites. It is dealt with the major complex task for which needs to deal not only with complex spatial and functional interrelationships established and activated at any one time in the urban contexts, but with the modification of these patterns over time (Alfrey and Putnam, 1992, 182).

Responding to the complexity of urban heritage sites, the new interpretation studies has formulated the application of range of disciplines in order to provide more detailed understandings of heritage areas. It is the fact that “our understanding of the past has grown because inquiries have experienced various aspects of the evidence at different periods of the discipline's development and so more complex understandings have been constructed” (Copeland, 2006, 84).

Closely related to the constructed understandings, two way of interpretation approach becomes significant; constructive and positivist interpretation approaches (Table 1). Constructivist theory deals with knowledge, learning and understanding the ways of our living environment (Brooks and Brooks, 1993). By doing so, self-regulatory process of understanding is the main task of constructive interpretation approach. It identifies a set of knowledge for “understanding the past through the tools of concrete experience of the historic site, providing the opportunities for collaborative

discourse and allowing reflection" (Copeland, 2006, 84). Constructive interpretation consists of chronological expressions, evidence of interpretation, visitor exploration and developing strategies for improving the interpretation. As Copeland (2006) discussed; positivist interpretation approaches will generally give ready constructed facts and fixed view of the site as it 'was' in the past and require little of the visitor in understanding the place or the processes that formed it (Lewthwaite, 1988, 86). Getting a deeper understanding of the site will necessarily encompass going beyond the simple and portraying the complexities of the site and how constructions about it have been made (Potter, 1997, 37). A constructivist approach needs to be challenging and allow the visitor to make their own meanings (Hein, 1998, 155).

Table 1 The main issues of positivist and constructivist interpretation approaches (Copeland, 2006, 88).

Positivist Approach	Constructivist Approach
The site is presented part to whole with emphasis on locational and factual knowledge	The site presented whole to part with emphasis on concepts of chronology, change, evidence of interpretation
Sites rely heavily on guiding and intermediary technology such as audio-visual techniques	Sites rely heavily on the use of evidence
Visitors are viewed as consumers of knowledge	Visitors are viewed as thinkers with present conceptions and emerging ideas about the past
Interpretation is didactic	Interpretation mediates the historic environment for visitors
Strict adherence to set-out routes and explanations is highly valued	Visitor exploration is highly valued
Interpretation strategies are aimed at the individual	Interpretation strategies are aimed to encourage discourse
Assessment and evaluation seek the correct response to validate success of strategies	Assessment and evaluation seek to discover perspectives and improve interpretation

Parallel to these developments, ICOMOS has started to work on the preparation of a specific charter on interpretation and presentation of cultural heritage sites. Firstly, the ICOMOS Venice Charter (1964) indirectly mentioned the importance of interpreting archaeological ruins as stressed that; "every means must be taken to facilitate the understanding of the monument and to reveal it without ever distorting its meaning" (Venice Charter, 1964, Article 15). Following, ICOMOS Charter for Protection and Management of the Archaeological Heritage which was inspired by the success of the Venice Charter (ICOMOS, 1990) directly introduced the needs of interpretation in archaeological sites for understanding the origins of the site by the public. The charter especially noted that experts should be more conscious for interpreting archaeological sites by means of doing reconstructions in order to prevent possible misunderstandings and/or misapplications. It is pointed that; "Reconstructions serve two important functions: experimental research and interpretation. They should, however, be carried out with great caution, so as to avoid disturbing any surviving archaeological evidence, and they should take account of evidence from all sources in order to achieve authenticity. Where possible and appropriate, reconstructions should not be built immediately on the archaeological remains, and should be identifiable as such" (ICOMOS, 1990, Article 7). The Australian ICOMOS Burra Charter (1999) is one of the earliest documents that covers the concept of interpretation in a comprehensive way. The Charter is of particular significance due to its definition of place which comprises site, area, land, landscape, building or other work, group of buildings or other works, and may include components, contents, spaces and views. That place forms with cultural significance, which consists of aesthetic, historic, scientific, social and spiritual values for past, present or future generations (Rifaioğlu and Şahin Güçhan, 2008) and it defined interpretation as "means all the ways of presenting the cultural significance of a place" (ICOMOS, 1999, Article 1.17). Overall, the Australian ICOMOS Burra Charter (1999) put a special emphasis on the issue of interpretation by pointing out that any kind of interventions should not damage the interpretation knowledge of the place. It also firstly mentioned the participation of people to the interpretation of a place which "has special associations and meanings, or who have social or other cultural responsibilities for the place" (ICOMOS, 1999, Article 12). Finally, it

mentioned that "interpretation should enhance understanding and enjoyment, and be culturally appropriate" (ICOMOS, 1999, Article 25).

After almost seven years of working process the ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites called as Ename Charter was officially approved and announced at the 16th General Assembly of ICOMOS in Quebec City, Canada[1]. With this charter, interpretation evolves more than merely a terminology to the methodology for the conservation of cultural heritage sites. The charter should be taken into consideration as a comprehensive methodological framework for interpretation and presentation of cultural heritage sites. It defines seven and close inter-related principles in order to achieve ethically and technically correct interventions via interpretation through the cultural sites.

Within this context, interpretation and presentation of heritage places can be defined as an act which deals with hidden, unseen or may be unrealized visual, written, oral information regarding heritage places that can become more visible and apprehensible for everybody. It is closely related to knowing the significance of heritage places, awareness of conservation values and needs for sustaining heritage places.

At this point, the Council of Europe's Faro Convention of 2005 become more critical and important for realizing and interpreting common heritage of Europe by participating social and cultural life to the community. It was stressed "as a dimension of the right to participate in the cultural life of the community, as well as the right to education and to be informed" (Jameson, 2020, 4). In this context, Interpret Europe's Freiburg Declaration focuses on responsibilities of governmental and non-governmental bodies to the interpretation efforts in cultural heritage sites (Interpret Europe, 2019).

However, interpretation of heritage places is relatively new and difficult task for heritage experts and needs more "empirical research on the examples of heritage interpretation are essential" (Yıldırım Esen, 2007, 6). Through the world, interventions for interpretations of heritage sites most commonly apply on small scales or uniform areas like single or group of buildings with their nearby surroundings, archaeological areas, and natural landscapes. On the other hand, interpretation and presentation in living urban heritage areas is very complex and difficult subject since they have layers of meanings, witnesses of significant events, old and new buildings, traditional and new functions, traditional and new lifestyles, different property relations, old and new residents, material and immaterial cultures and so forth. Therefore, there should be more than signage, guided tours, leaflets, statues, any kind of written and visual things for the interpretation of urban heritage areas and they necessitate comprehensive interpretation programs.

Under these circumstances, this paper focuses on the interpretation studies on urban conservation areas in the UK and discusses their reflections through a special living urban-industrial conservation area, The Jewellery Quarter, Birmingham. The Jewellery Quarter is a unique urban conservation area where industrial heritage and modern urban dynamics have been merged and an extensive urban interpretation and presentation program has been conducted by related bodies.

2. Key Themes and Discussions on Heritage Interpretation in the UK

In the United Kingdom, interpretation activities have been occurred from the beginning of the concept and hotly discussed both theoretically and practically developed key themes through last decades. Theoretical perspectives firstly centre on the issue of objectivity and subjectivity of interpretation activities. Peter Rumble, former the Chief Executive of English Heritage, discusses interpretation activities in heritage sites theoretically and mentions that interpretation activities need an overall understanding of heritage. Rumble (1989) argues that, without overall

[1] The author has been attended to the Scientific Committee Meetings at the 16th General Assembly of ICOMOS and presented a methodological framework for understanding and preserving the spirit of place. The Ename Charter was announced one of the most comprehensive and important documents on interpreting cultural heritage sites at that Assembly and appreciated from all scholars from all over the world.

understanding, incomplete interpretations can occur, and they can be produced subjective interpretations of the knowledge of heritage and called as "incomplete interpretations".

Incomplete interpretations classified as subjective studies where it is not seeing the heritage as a component of a larger canvas like where the story starts and where it finishes. Interpretation should consist of any aspect that lies behind the formation of heritage sites and should avoid any less rigorous approach on understanding and presenting heritage. Without doing so, heritage sites are under "a greater danger in any interpretation based on a selective standpoint is the risk of the personal attitude of the interpreter coming through too strongly, particularly in the use of the past to point to a political lesson for today" (Rumble, 1989, 30-31).

Fundamentally, the subjective approach in interpreting the heritage sites can mainly be seen where the economic benefit of interpretation exists. Within the last four decades, especially in the UK, heritage interpretation has been used to get economic benefits from the visitors by organizing living history presentations, which are called as "live interpretation". It has become popular and commonplace in many Western countries (Evans, 1991). Within the scope of this approach, heritage interpretation focuses on setting an amusement activity place by using any kind of historical reference. Initially it is defined as "being any presentation using people, usually costumed, whether in an historical environment or not, which aims to place artefacts, places or events in context against the background of the human environment of the past" (Robertshaw, 2006, 42). This approach creates manufactured heritage interpretation, in which heritage sites become stages for historical amusements and create economic benefit to the investors. It is mainly focus on tourist attractions by various living history activities on the heritage sites and create illusions for having tourists' motivations (Figure 1). This form of interpretation has been criticized not only for blurring the lines between education and entertainment but also perceived as inherently 'fake' simply because of its theatrical overtones (Malcom-Davies, 2004, 281).

Figure 1 The living history interpretation activities at Warwick Castle (Photographs taken by the author).

This approach in the interpretation studies is discussed in relation to the "heritage industry", which is regarded as a big threat to heritage sites. Considering the heritage industry in the UK, Hewison (1989) points out that "heritage is in danger, but not from external threats such as decay or redevelopment, nor even, it would appear anymore, from economic recession. The danger is internal, the enemy is within, and it is carrying out a massive subversion of those very 'outstanding universal values'" (Hewison, 1989, 18). The main argument is still present in heritage industry and the challenge of how far the living history presentations represent historical truth, and just how far scholarship can be translated into authenticity of representation.

At this point, the debate on living history presentations continues with the debate of "hot interpretation". It is coming from the discussion of "how to represent the inhumanity, the cruelty, the squalor, the filth and stench of some events... We can't kill people on the battlefields; we can't have dysentery and disease in medieval re-enactments" (Rumble, 1989, 29). The combination of "hot interpretation" with "heritage industry" results in another debate on creating prejudices on the history of countries. As Laenen (1989) states "one of the most fundamental problems is the subjective and often inaccurate interpretation and presentation of the past, originating in our

inevitable links with our own time and culture and in our own prejudices and projections" (Laenen, 1989, 89). Literally, it is a difficult subject and needs surely highly scholar knowledge, objective and ethical principles.

Besides the above-mentioned themes and debates, the importance of interpretation studies for the public benefits are discussed among the related bodies and one major topic is produced in the interpretation studies as "public-archaeology" (Merriman, 2004). Public archaeology is related to interpretation efforts on archaeological sites, the reason of which is that archaeological investigations are conducted by public money and therefore the public should in some way benefit from them. Interpretation activities for public archaeology bring an important discussion which is commonly referred to as "reconstructing interpretation". In order to express the knowledge of archaeological sites to the public, reconstruction activities can sometimes be chosen as a best way of interpretation. However, these interventions can also be classified as subjective interpretations if there is not enough knowledge of reconstruction.

When heritage interpretation themes are evaluated, it can be concluded that natural and cultural heritage interpretation should be fostered in an inclusive assessment and needed to have holistic achievements not only for analysing the heritage sites itself but also for the understanding of their outstanding universal values for both local and non-local participants. Thus, heritage interpretation studies should "ought to be seeking a passionate detachment from the past, passionate in the story it tells, and passionate in the intention to preserve objectivity in the telling of what may be an intensely subjective story" (Rumble, 1989, 31).

For this reason, it is necessary to analyse the approaches that allow the revealing of simple, objective senses in the presentation and interpretation of cultural heritage sites. Rather than indirectly interpreting the cultural heritage site, it is necessary to provide opportunities for individual interpretation of cultural heritage sites by providing the environments, interfaces, and opportunities where those who visit or live in the cultural heritage site can make their individual experiences, sensory intuitions, their internal relations with the heritage site and their observations. In order to do this, it is necessary to transfer objective scientific information about the field of cultural heritage and to determine strategies that will contribute to the interpretation and interpretation of each individual's environment with their perceptions and experiences, together with the transferred information.

3. Interpretation Strategies in Birmingham

Birmingham is the second largest city of England and one of the pioneering cities of industrial movement of the United Kingdom. From the early sixteenth century onwards, the city has the big part of the UK's metal trades. According to providing vital transport links of fragile and valuable products, a network of canals was built with other cities and with the country's ports. After the industrialization and the coming of the railway in the middle of the nineteenth century the city became an industry capital of the UK and it has been called "the cradle of invention" (Zuckerman and Eley, 1979, 21).

As it is noted in Birmingham Heritage Strategy document published by Birmingham City Council; the purpose of interpretation practice in Birmingham heritage areas is raising awareness of heritage sites including the physical and non-physical values of them to build a constructive sense of local identity and attracts visitors to the city. Therefore, Birmingham Heritage Strategy focuses on interpretation practice in Birmingham for developing interest to Birmingham's living heritage traditions. It draws "inspiration from cultural legacies of thought, artefacts and buildings and the vibrant cultural mix that is Birmingham today and connects with the themes of the Cultural Strategy: Culture on your Doorstep, Next Generation, Creative Industries and Great International City" (BHS, 2014, 5).

In this context, many museums, historic parks, botanic gardens, water reservoirs, aquariums, science centres were established to exhibit and experience the cultural, natural and historical

values of the city. On the other hand, the development of Birmingham as a settlement and the interpretation strategies for the integrity of the cultural and physical values that it has acquired in the historical process are discussed together with the factors that contribute to the strengthening of the city as an industrial city. By preserving the roots that make up the industrial city identity of Birmingham on an urban scale, it is tried to interpret the spatial and contextual relations they establish with each other. This approach, which can be considered as the upper scale interpretation strategy of the city, contributes to the preservation and interpretation of urban morphology. From this point of view, this approach can also be characterized as a very important urban conservation strategy. The holistic preservation of the urban organism and its evaluation together with interpretation strategies contribute to the perception and continuity of the values belonging to the city at a higher scale. In this context, the interpretation studies carried out in Birmingham can be grouped in relation to socio-cultural structure, historical structure, physical structure, and natural structure.

Canals, railway heritage, streets and squares stand out in relation to urban structures. Canals are an important urban structure of Birmingham because it is a movement spine of industrial products before the railways. It is 55 km. long within the Birmingham which is longer than Venice. As Haddleton stressed (1987) “During the late 19th century Birmingham’s canals carried 9 million tons of cargo annually – and in 1965 virtually none! This decline in canal traffic led to a general expectation of the loss of the canals themselves but in 1982 a Programme of Canal Improvements was set up by Birmingham Inner City Partnership which enabled 1,25 million pounds to be spent on creating six miles of attractive and imaginative canal side walkway through inner Birmingham” (Haddleton, 1987, 8).

In this way, local information about the canals can be obtained from the signs along the canals. In addition, the traditional technology used in the canals is preserved and used today, allowing the principles of movement in the canals to be interpreted and understood within the framework of the physics rules of the bots. (Figure 2-3).

Figure 2 Interpretation signs around the canals (Photographs taken by the author).

Figure 3 Birmingham canals and near surrounding (Photograph taken by the author).

The railway network and architectural heritage, which started to be used actively in Birmingham right after the canals, is another interpretation element in the urban structure. Preserving and using the railway stations today and presenting the histories of the buildings in the station buildings allow the railway heritage to be interpreted and understood (Figure 4).

Figure 4 Railway stations allow to interpret railway heritage in Birmingham (Photograph taken by the author).

It is observed that the use of streets and squares continues in Birmingham in line with the decisions taken to preserve the original street texture and squares. Squares are actively used as the city's entertainment and event venues, especially on weekends (Figure 5). In the events taking place in the squares, themes that will highlight the physical and socio-cultural values of Birmingham come to the fore. On the other hand, in the events taking place in the streets and squares, experience can be gained with multidimensional dynamics that include the tangible and intangible values of the city, such as local productions, festivals, representation of multicultural urban identity, and street arts (Figure 6).

Figure 5 Victoria square in the city centre (Photograph taken by the author).

Figure 6 Squares are actively used for local events (Photograph taken by the author).

The scientific, artistic, archaeological, cultural, and social values of the city are interpreted in thematically designed museums such as jewellery museum, pen museum, coffin museum, etc. It is designed as a static and/or dynamic-interactive museum in accordance with the museum's themes. It is observed that traditional and/or innovative interpretation-experience tools related to the themes of museums are designed in addition to the principles of digital interpretation equipped with the opportunities of the age in interactive museums. The cemeteries in the city are protected together with their landscape as urban spaces where the urban memory can be perceived as an open-air museum.

4. Interpretation Strategies in The Jewellery Quarter

The Jewellery Quarter is known as a settlement in England in the 16th century, where metal production and the design and mass production of metal-related products were made. The quarter was designated as a cultural industrial heritage site to be protected in 1980, with its jewellery production workshops, which constitute its unique architectural heritage, and buildings containing residential and commercial activities.

After the designation of conservation area, design and conservation guidelines through the building and conservation management plans for the cultural heritage area were prepared. In parallel with the studies carried out for the conservation of the area, strategies and practices have been developed for the interpretation of the heritage area with the participation of the residents by organizing workshops, site trips, sport activities, special occasions of the Jewellery Quarter and the people who come to the area as visitors.

The main objective of the interpretation strategies of the Jewellery Quarter is the preservation of the original character formed by the integrity of tangible and intangible heritage values. In line with this goal, the interpretation strategies implemented in the Jewellery Quarter are designed to include actions to ensure that the values of the area are understood or perceived by everyone who comes to the quarter.

In order to provide education in the art of jewellery, which developed based on the master-apprentice system, the first Jewellery School of Birmingham was established in a metal factory located on Vittoria Street in 1890 in the Jewellery Quarter. Today, the education continues in the same building under the Birmingham City University, School of Jewellery. Sustainability of jewellery art is ensured by the inclusion of jewellery workshops, which form the character of the area, within the school, where the education of jewellery production is provided by both traditional and contemporary methods. The library in the school contains all local resources related to the Jewellery Quarter. The school's location in the Jewellery quarter contributes to the continuation of the functional identity of the area (Figure 7-8).

Figure 7 Birmingham City University, School of Jewellery in the Jewellery Quarter (Photograph taken by the author).

Figure 8 School of Jewellery classrooms (Photograph taken by the author).

The interpretation of the area is provided through the museums in the Jewellery Quarter. Through the thematic museums in the area, the different and various historical values of the heritage site are interpreted. The different themes of the museums allow visitors to understand and interpret the different values of the area. Some of the thematic museums are Pen Museum, Coffin Museum, J&W Evans Silver Factory Museum and Museum of the Jewellery Quarter. In the Pen Museum, there are activities and presentations about the contribution of the Birmingham Jewellery Quarter to the production of pen in England and the interpretation of the pen as one of the cultural heritage values of Jewellery Quarter. The Coffin Museum also known as Newman Brothers Coffin Works another very well conserved and designed museum in order to interpret the original coffin works in the original factory building (Figure 9).

Figure 9 Newman Brothers the Coffin Museum in the Jewellery Quarter (Photograph taken by the author).

All production system and items of the factory are conserved and experienced while visiting the museum. The traditional production system of the factory is interpreted by the interpreters. The museum has ordinary public events and programs including school tours by setting up interpretation experience to get information about one of the unique and not very well-known cultural heritage value of the Jewellery Quarter. (Figure 10-11).

Figure 10 The metal works of coffins are interpreted by the interpreters (Photograph taken by the author).

Figure 11 The original production system and metal moulds (Photograph taken by the author).

The J&W Evans Silver Factory is one of the most influential places to interpret the unique traditional atmosphere of the silver production factory and learn about the industrial heritage of the Jewellery District (Figure 12).

Figure 12 The inside of J&W Evans Silver Factory (Photograph taken by the author).

Besides the museums, participatory interpretation strategies have been developed in the Jewellery Quarter. Interpretation and presentation of the cultural heritage values of the area are ensured through the events held regularly throughout the year. In this way, not only the people living in the area better understand the cultural heritage values of the living areas, but also the promotion of the area helps the visitors who come to the area to understand and interpret the cultural heritage values more actively. In the events held as part of the Birmingham heritage week in September every year, a wide variety of activities are held to interpret the heritage sites of the Jewellery Quarter. Such as factory tours, walking and discovering activities, art and artistic workshops, several activities in Key Hill and Warstone Lane cemeteries, hands on conservation workshops and guided street tours (Figure 13).

Figure 13 The historical cemetery area in the Jewellery Quarter turns into a public activity area especially on important days. For example, the Halloween event takes place in the cemeteries. The historical values of the cemetery area are shared with the participants and the interpretation of the area is carried out (Photograph taken by the author).

Interpretation items in the Jewellery Quarter are located at every point of the area. There are statements and signboards describing important moments and memories on pavements, roadsides, open areas, building facades, and so forth (Figure 14). From the moment you enter the protected area, information about the area is systematically transferred to the visitors.

Figure 14 Some examples of interpretation items in the Jewellery Quarter (Photographs taken by the author).

Social media accounts such as JQ Townscape Heritage, JQ Neighbourhood plan, JQNF, JQ Cemeteries Project related to the Jewellery Quarter are regularly shared about the interpretation of the area. NGOs like as Birmingham Conservation Trust, The Jewellery Quarter Development Trust in the area contribute to the interpretation of the area by organizing regular exhibitions and excursions. Interpretation of the heritage values of the Jewellery Quarter is carried out with alternative sports activities such as orienteering, run and walk Jewellery Quarter.

As a long-time resident of the Jewellery Quarter, I obtained several information on heritage values of Jewellery Quarter in every day. While living in the area, everybody can interpret the

significance of space and create a dialogue between the past and the future (Figure 15). Accordingly, the presence of old factories producing with traditional and modern techniques around the residential areas contributes to the continuity of the spirit of the place. In this way, the area has an urban-living industrial heritage identity. Thanks to the information and activities related to cultural heritage values at every point of the area, awareness of the place they live in increases and the interpretation of heritage values is ensured.

Figure 15 Residential area in the Jewellery Quarter (Photograph taken by the author).

5. Conclusion

In the light of developing perspectives and theoretical approaches about interpretation of cultural heritage areas; it is understood that the interpretation studies carried out in Birmingham, Jewellery Quarter have a content that sheds light on current theoretical approaches and practices

and inspires the formation of innovative and original strategies. The participatory, holistic interpretation approach is handled in a context that covers all the stakeholders who are familiar or foreign to the heritage area by considering the original tangible and intangible values of the cultural heritage area and can provide all people with a sense of belonging to the heritage area. Interpretation studies carried out in the Jewellery Quarter overlap with the innovative-participatory interpretation approach, which is intended to be considered as a new interpretation culture and allow the cultural heritage area to be perceived as common heritage and allow everyone who is in the area, living or visiting, to suddenly experience the state of being a common about the area.

For this reason, education in the field of cultural heritage, with interpretation strategies created entirely by the dynamics and values of the cultural heritage area, without overdoing it, creating a misleading or false environment, science, ethical principles, professional interventions, economy, participation, social norms-principles, originality, new and contemporary uses together form the collective voice of the cultural heritage field.

The interpretation and presentation of cultural heritage sites contributes to the preservation and sustainability of heritage sites, as well as increasing the interest of national and international visitors and/or the public in heritage areas by making the unique qualities of heritage sites more understandable.

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Resume

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Conservation problems of rural architecture: A case study in Gölpazarı, Anatolia

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Abstract

Rural areas have generous variety that combines local geographical features, buildings planned according to climatic conditions and the tradition of using local building materials, social relations and habits of the local people in their daily life. The purpose of this study is to determine the rural architectural heritage that is about to disappear; evaluate conservation proposals and developing policies to increase the interest in rural. In this study, the rural architectural heritage and conservation problems of Gölpazarı and its villages were evaluated as a representative area which has been an important settlement from prehistoric times until today in Central Anatolia. The architectural features have been examined with the settlement characteristics, analyzes, building typologies, construction techniques and materials. Rural areas have conservation problems such as immigration, socio-economic changes, and improper architectural interventions at the settlement and building scale. These problems have been analyzed through Gölpazarı, which is in danger of losing its original identity with structurally as well as socially. Based on the findings, conservation proposals for the building and settlement scale were interpreted. The cultural, social, economic and tourism potential of the settlement were evaluated to ensure the protection and sustainability. There has not been noteworthy research in this context in Gölpazarı and its surroundings. This study has potentials to be an example for developing rural heritage management in Anatolia.

Keywords: rural architecture, sustainability, conservation, vernacular architecture, preservation.

1. Introduction

Rural architecture involves the structures and environment built by the settled societies in rural areas. A rural area has three-component composed of lands where agricultural activities are carried out natural environment and human settlement (Gy Ruda, 1998, 93). The European Charter for Rural Areas refers to non-urban and natural areas that are part of agriculture, forestry, aquaculture, including small towns and villages in or on the shores (EUCFR, 1996). TUIK's (Turkish Statistic Institute) definition of a rural area that; all settlements other than provincial, district centers are considered villages according to administrative status besides that, a population of less than 20,000 according to the population criteria as in the Village Act (UKKS, 2014, 3).

Rural architecture is a social representation that connects cultural beliefs and values (Bronners, 2005, 23-24; Lawrence, 2005, 110). ICOMOS' "Charter on Built Vernacular Heritage" was published in 1999. With this international charter, vernacular heritage, traditional structures, the principles

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for their conservation and application methods were explained. The traditional buildings in rural areas have different characteristics because of local materials, economic opportunities, climate, and social life (ICOMOS, 1999). Besides that the buildings are produced by traditions according to the relationship between environmental contexts, special needs, housing values, life culture, and available resources (Oliver, 1997; 2006). Factors such as the local material, the topography of the area, the shelter area to be created, and the spaces to be opened in the building depending on the wind direction affect the architecture (Donovan & Gkartzios, 2014, 340). Local building materials vary due to the geographical features of each region and are preferred with their quick availability and economy. Local construction traditions reflect local identity of the region (ICOMOS-Turkey, 2013; ICOMOS Turkey Architectural Heritage Conservation Charter). The lifestyle of local people and their socio-economic structure also affect the rural architecture with interior arrangement and the size of the houses.

Rural architectural heritage has been lost day by day due to migration, globalization, changing economic and social policies. Recently, migration from rural to urban has increased with the decrease in agriculture and animal husbandry, job opportunities in cities. With the industrialization the urban population increased and rural areas lost their popularity (Ballantyne & Ince, 2010, 2). The migration affects the production and social system in the producer market as well as the consumption market by changing their place (Tekeli, 1975, 153). The abandonment problem has emerged in rural settlements where economic activities do not continue.

In Turkey, after the 1990s, agriculture was separated from the soil; rural life has changed with the change in the quality of agricultural production in rural areas, the decrease in agricultural employment and the development of non-agricultural activities and industrialization (Öğdül, 2019, 41). In recent years, migration from rural areas to cities has increased, the cities have become attractive because of the job opportunities and socio-economic life.

The population in rural areas of Turkey is 75.8% in 1927, but today it is 7.7% (Suiçmez, 2019, 59). The concepts of "urban" and "rural" lose their meaning beyond their morphological appearance. It is important in terms of theoretical, political, cultural, financial, density, access to services, the age distribution of the population, and demographic changes (Lacour & Puissant, 2005, 729). Local building traditions are threatened economically, culturally and architecturally (ICOMOS, 1999, 1).

Traditional architecture has been neglected with the evacuation of the settlements in rural areas. With the loss and demolition of abandoned buildings, new structures, which have no historical and aesthetic value and are different from the region's architecture with material and construction systems, have been built. However, it is seen that unconscious interventions are made in the traditional buildings with the change of today's living conditions in rural and they lost their architectural identities. Because of the economic conditions, local people could not repair their houses. Thus, it cannot ensure the sustainability of rural architecture.

On the other hand, migration from the rural to urban causes push–pull factors of sophisticated urban living and fragile job opportunities (Oliver, 2006). Important changes occur in cities such as standardization of behaviors, needs and requirements dependent on globalization, access to services, and new paradigmatic combinations. The silhouette of cities changes, demographic trends emerge in rural areas, identity is lost and new identity formation occurs (Lacour, Puissant, 2005, 729, 736). It is the main problem of governments, planners, architects, conservationists and experts of different disciplines against globalization (ICOMOS, 1999, 1).

There are many local and regional initiatives from different disciplines for the sustainability, quality and protection of rural areas. There is an urgent need to develop managerial initiatives to ensure the protection. This situation is directly related to life and environmental quality, food production, cultural heritage, local and traditional knowledge, sustainable development. However, UNESCO, FAO, ICOMOS, IFLA, ITKI are working to urgently improve the quality of the rural landscape for this purpose (ISCCL, 2013).

This study was carried out in the Gölpazarı district of Bilecik and its villages, which has been an important settlement since prehistoric times. The aim of the study is that the settlement has serious immigration problem; even though it has fertile agricultural lands and products, there is an economic livelihood problem so, the rural architectural heritage is in danger of being lost. Field analysis was carried out on its state of preservation and building density with numerical and photographic documentation. Architectural studies outcomes and regional values of the region were evaluated together, conservation problems had identified, proposals and strategies concerning the problems related to the conservation of architectural heritage were presented.

2. Materials and Methods

2.1. Study Area

Bilecik's Gölpazarı settlement was chosen as the study area, because of its historical past like many settlements in Anatolia, and preserving the character of the settlement. Bilecik is located in the southeast of the Marmara region in Turkey (Figure 1). Bilecik's Gölpazarı district was established in the north of the Göl Plain, has been an important settlement from prehistoric times. Karaağaç Tumulus, Yassı and Arıcaklar Tumulus in the district convert the traces of the Hittite, Phrygian and Lydian civilizations belonging to the Chalcolithic period. This region has been the settlement of the Bithynia Empire since the 3rd century B.C. (Tuğlacı, 1985, 54; Sevin, 2007). In Bilecik, there were Belakoma, Agrilium, Lamounia, Thebasion / Sevasion, Armenocastron, Lake-Flanos settlements of the Bithynia Empire. The center of Bilecik was called Belakoma, and in this region, between the Hamsu and Debbağhane Streams, there was a castle, of which only the foundation remains have survived (Darkot, 1986, 611). The Byzantine Empire had dominated this region since the 4th century AD. (Özler, 1967, 28).

After the 1071 Malazgirt War, Bilecik entered the borders of the Seljuk Empire (Tuğlacı, 1985, 54). The Ottoman Principality came from Central Asia in the 13th century and settled in Bilecik's Söğüt district and its surroundings. During this period, Osman Bey took the Harmankaya Landlords in the Gölpazarı region of Bilecik from the Byzantine Empire and started to grow the Ottoman Empire in these lands (Başkaya, 2006, 6). He declared his principality by taking Bilecik in 1299, then Yarhisar and İnegöl (Gökbilgin, 1997).

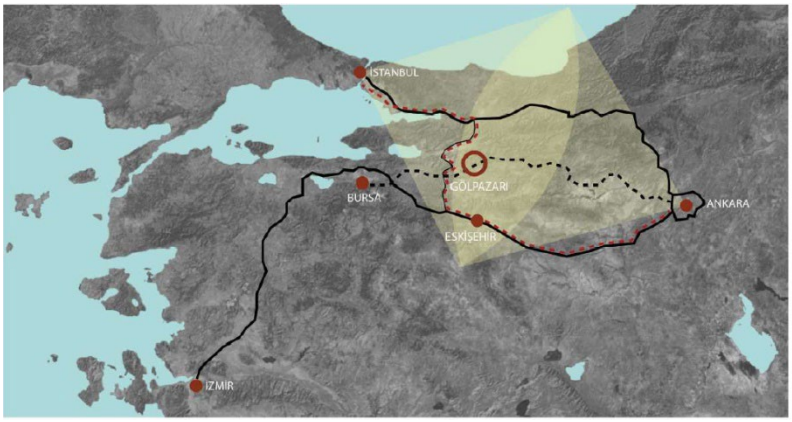

Figure 1 Geographic location of Gölpazarı (Keep Your Village Alive Project)

In the 14th and 16th centuries, Gölpazarı became the most developed township, and the excess of agricultural activity was noteworthy. Its population increased continuously until the 16th century (Turğut, 2015, 188). In this century, the township was a winter quarter and had become an important marketplace where market taxes (bâc-ı bazar) were taken, and Gölpazarı had the highest income compared to other towns of Bilecik (Turğut, 2015, 341). The district became important because it was on the Baghdad Road in the 16th century, and it was the gateway of the Marmara Region to Anatolia.

2.2. Data Collection

The data was produced from field analysis and surveys between summer period of 2013 and 2019. In this long-term study, 48 villages in the district were analyzed with agriculture, husbandry, climatic conditions, architectural, archaeological, and natural heritage (Figure 2). The population of the region, age distribution, living conditions of the indigenous people, livelihoods, utilization of environmental resources, and living habits were examined.

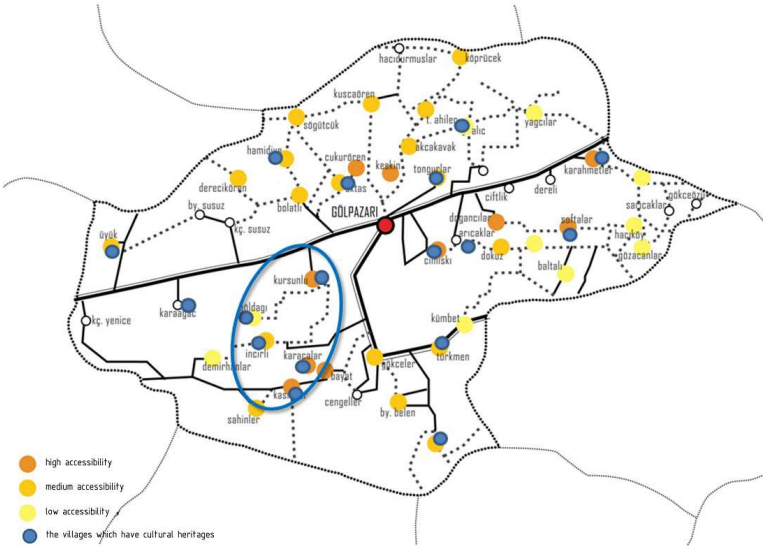

Figure 2 The villages of Gölpazarı (illustration arranged by Keep Your Village Alive Project, Past to Future Exhibition, 2015.)

This study, which has been ongoing since 2013 and known as the "Keep Your Village Alive" project in the academic platform, has many products. The project continued with restoration and repair works, social and cultural events, exhibitions, symposiums, and rural sustainability workshops in the region. The data obtained from all these studies have been archived under architectural, social, and ecology titles. This paper aims to present the conservation problem of the architectural heritage of Gölpazarı by examining the building typology and the changing built environment.

2.3. Methodology

As mentioned in the Burra Charter; the area was defined, its rural analyses were prepared, the data collected to identify the traditional building typologies, material and construction techniques. In the second stage, the conservation problems of the region were determined. In the third stage, the opportunities were evaluated, and suggestions were made regarding the architectural, cultural, tourism, and economic potential of the region (Figure 3).

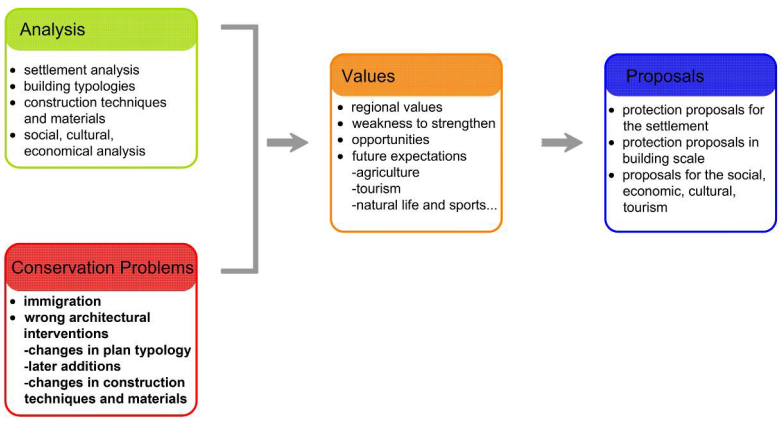

Figure 3 Settlement input and output analyses diagram (illustration: authors)

The analyses in this study are concerned with the determination of the original values of village houses and the relations with local materials. Qualitative research methods were utilized with field surveys. During the fieldworks (2013-2019), settlement analysis (occupancy, preservation status, building usage, construction systems), building typologies (plan typology, facade features), construction techniques and materials were investigated for architectural documentation.

Conservation problems have also been identified with settlement analyzes. Despite the problems such as migration and abandonment encountered in many similar settlements in Anatolia, architectural, social, economic, and cultural opportunities were evaluated for the conservation and sustainability of the settlement.

3. Results And Evaluations

3.1. Historical and Traditional Rural Fabric

The settlement has an active transportation network between Bilecik, Sakarya, and Bolu cities. Trade and transportation axes form the nodal point in the district center; Mihal Gazi Caravanserai (Figure 5a), Mihal Gazi Mosque, Turkish bath, and Zincirlikuyu are important monumental buildings at this point, dating back to the 1400s. These structures are the focal point of the district and the streets in organic form converge at the center (Figure 4). The Kasımlar Mosque (Figure 5b) dated to the end of the 17th century in Kasımlar Village, the Byzantine bath, and church ruins in Bolatlı Village are important monumental values. There are many archeological ruins, tumulus and architectural structures in the villages of Gölpazarı (Figure 2).

Figure 4 Main transportation axes and important structures of Gölpazarı district (illustration: authors).

In the settlement analyzes of the district and its villages, the functions of the buildings, the number of floors, their preservation status, construction techniques, and registration status were inventoried and summarized in Table 1. It is seen that the growth in the district was planned regionally. Each village was clustered within itself and was connected to the district by a road. It has been determined by the occupancy analysis that the construction is about 35-40% ratio in the villages and 65% in the district. It is noteworthy that this ratio reaches 85% around the main roads, and the parcels on the main roads and fully used (Figures 2 and 4). The buildings were arranged with gardens, and the houses have entrance from the streets (Figures 6 and 7).

Figure 5a Mihal Gazi Caravenserai 15 th century (photo:authors); **b** Kasımlar Mosque-17th century (photo:H.Yıldız).

The rural architecture in the villages consists of one or two-story houses, one-story barns, warehouses, and hayloft structures (Figure 6). In the district there are new constructions with the reinforced concrete system together with traditional structures. The traditional buildings were limited to a maximum of three floors, and the ratio of these three-story buildings (including built with the reinforced concrete system) to the number of whole buildings in the district center is 9% (Table 1).

Figure 6 a Büyükbelen Village; **b** Keskin Village (photo:authors).

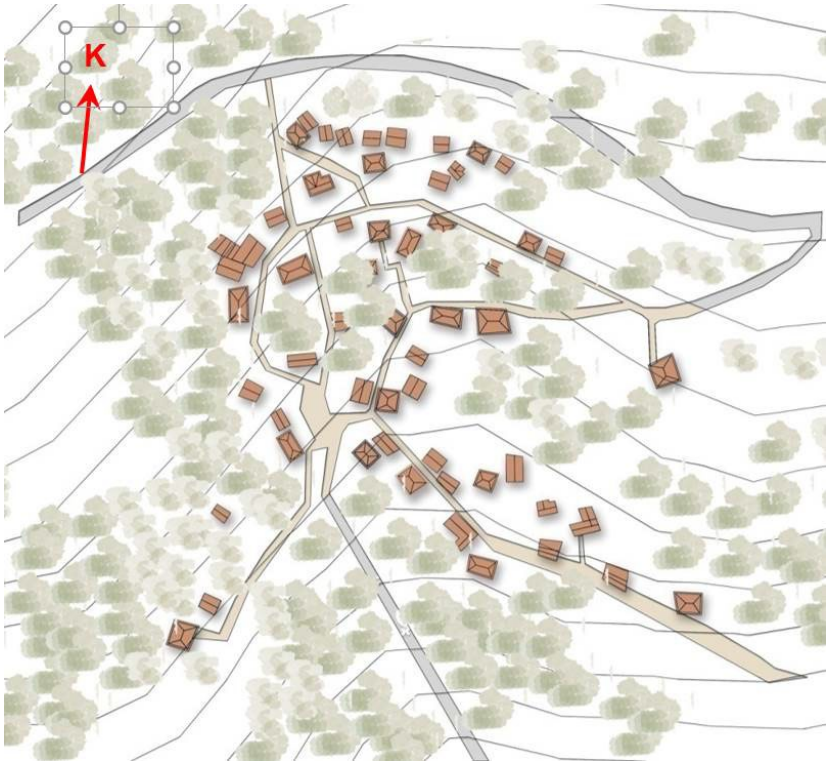

Figure 7 Kasımlar Village site plan (Keep Your Village Alive Project).

In order to the needs of the villages, there are also commercial, healthcare and educational buildings in the district (Figure 4). The traditional construction techniques of the settlement are the adobe and wooden frame system. Structures built with traditional systems have been preserved in the villages, but the ratio of reinforced concrete structures to the general number of buildings in the district center is quite high (58%). However, the damage conditions of the traditional buildings are medium and bad (Figure 8). The ratio of the buildings with high damage in the district is 17% and most of them are abandoned. While some of the buildings with moderate damage are used periodically, the local people try to keep their structures alive with minor repairs.

Table 1 Numerical data showing the settlement analysis of Gölpazarı villages

Villages	Preservation status			Building usage			Number of floors				Construction system				
	Good	Moderate	Bad	Permanent	Seasonal	Vacant	1 storey	2 storey	3 storey	4+ storey	Adobe	Masonry (adobe)	Wooden Frame	Reinforced concrete	Mixed structure
District center	46%	37%	17%	81%	9%	10%	29%	47%	15%	9%	21%	18%	3%	58%	2%
Akçakavak	63%	31%	6%	78%	12%	10%	38%	59%	3%	-	76%	21%	-	3%	-
Aktaş-Beşevler	74%	18%	8%	81%	5%	14%	31%	69%	-	-	53%	48%	-	5 %	-
Arıcaklar	61%	28%	11%	66%	13%	21%	23%	77%			81%	17%	2%		
Armutçuk	78%	25%	3%	46%	12%	42%	27%	69%	4%	-	76%	21%	-	5%	-
Büyükbelen	53%	42%	5%	71%	16%	13%	24%	66%	-	-	82%	17%	-	1%	-
Göldağı	42%	33%	25 %	36%	40%	34%	44%	54%	2%	-	74%	26%	-	-	-
Kasımlar	51%	24%	25%	63%	14%	23%	32%	78%	-	-	84%	16%	-	-	-
Keskin	52%	37%	11%	52%	37%	11%	16%	82%	-	-	86%	14%	-	-	-
Kurşunlu	75%	18%	7%	73%	18%	9%	18%	78%	4%	-	62%	34%	-	4%	-
Tongurlar	44%	41%	15%	44%	22%	34%	23%	76%	1%	-	77%	19%	4%	-	-

It is seen that the number of abandoned structures in villages has reached 40% in some villages. The buildings forming rural architectural heritage that could not be preserved by remaining in an abandoned state reached 40-50 percentage (Table 1).

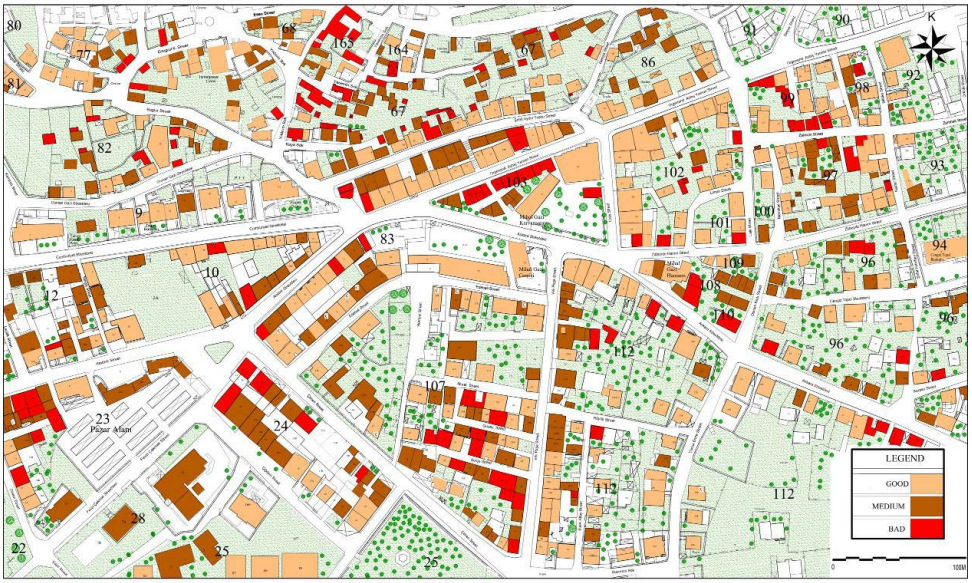

Figure 8 Gölpazarı district damage analyzes (authors).

3.2. Vernacular Gölpazarı Houses

Gölpazarı has monumental buildings belonging to the early Ottoman Period as well as important pavillions dated to the last period of the empire. Kadıoğlu Pavillion is known as a historical place belonging to the late Ottoman period and where the Kadi (Muslim judge) of this period lived, but today it is abandoned (Figure 9). It was observed that the houses examined in the region were built in the plan type with inner and corner/edge sofa according to the Turkish house plan tradition (Figure 10). The sofa is a space that meets many functions required by daily life such as eating, cooking, resting, sitting, and welcoming guests (Kâhya et al., 2018). In the plan type with an inner sofa, rooms are lined up on both sides of the sofa. In some types, it has been expanded by adding a stair or a side sofa (Eldem, 1954). The corner sofa plan is the type with the sofa in the corner and surrounded by rooms on two sides and other sides open to outside with windows or an entrance gate. The plan type with side sofa was encountered before the 19th century in Anatolia. Inner and central sofa plan types became widespread in the 19th century as vertical and transverse symmetrical (Günay, 1999, 62).

Figure 9 Kadıoğlu Pavilion survey drawing and 2019 photo (authors).

3.2.1. Plan typology

It has been observed that the plan typology of the pavilion buildings in the region and the traditional residential buildings are similar. The inner sofa type was widely used in rectangular planned houses and the plan layout has not been changed. Besides that, the original scheme of the square planned type has been disrupted with the new spaces added to the halls depending on today's needs due to the narrow interior spaces. The central sofas divide the long side of the building into two symmetrical parts and the rooms open to the sofas. This type of sofa is rectangular and extends along the front and rear facades of the buildings; its width is approximately 260-320 m. and narrower than the rooms. The main entrance doors open to the sofas from the front facades, in some buildings, the sofas are also accessible to the back garden (Figure 10a).

In the buildings which ground floors were planned as barn or woodsheds, the entrances to the first floor, where living spaces located, were generally arranged separately with stairs from the outside or by a single-arm interior staircase from the woodshed floors. The stairs on the living floors appear as "U" or "L" planned. The areas under the stairs were usually closed and used as closets. On the first-floor sofas of some buildings, "high sofa" was designed as a special sitting area, which can be reached with a few steps (Figure 10a). In some houses, corner rooms were arranged as "head rooms" and customized with architectural details and decorations.

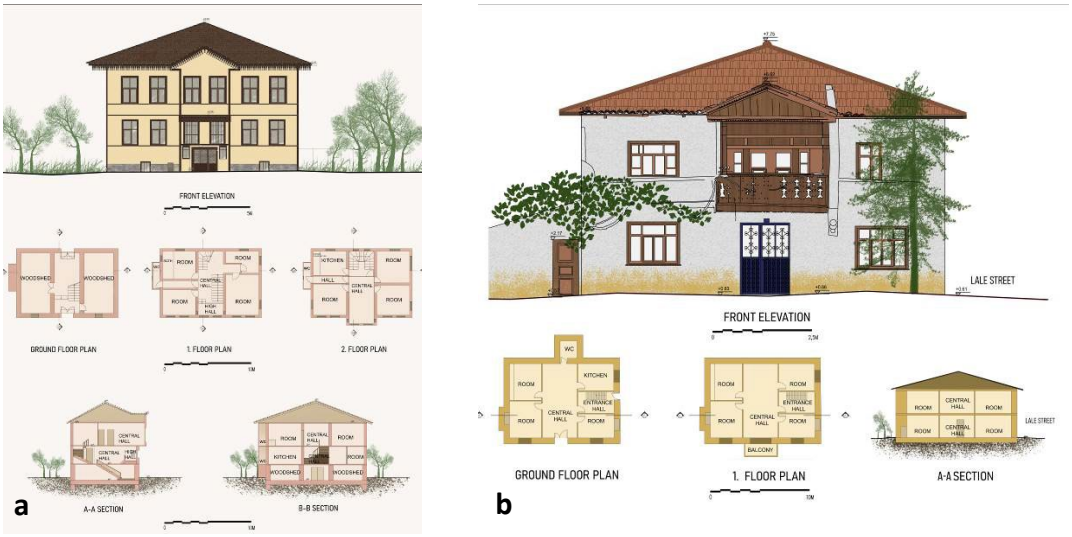

Figure 10 a A pavillion with inner sofa; **b.** A house with inner sofa (illustration: authors).

In some house plans, the wet areas were generally carried outside the buildings due to their architectural and plumbing arrangement (Figure 10b). In the buildings with less intervention, "gusülhane" and wooden cupboards have been preserved in the back rooms.

In the region, the plan type with a corner sofa is generally seen in square planned structures. Since these structures have narrow interiors, sofas have been converted into rooms or kitchen spaces and have become imperceptible (Figure 18).

3.2.2. Facade Features

It is noteworthy that all of the traditional buildings have a characteristic facade arrangement in the region, although their functions are different (residential or residential and commercial). The front facades of the houses have more specific feature with their symmetric layout and projections. The main entrance door was located in the middle and the windows were arranged symmetrically to the door on the façade. The central projections on the entrance doors emphasize the symmetry of the facade and the plan type of the inner sofa (Figures 8, 9 and 11). In houses with barn or woodshed on the ground floors, these facades are deaf and have narrow windows, while the layout changes on the upper floors (Figures 8, 9a and 10). Thus, the functions of the floors are perceived from the facade. The facades were generally undecorated and plastered; however, wooden floor beams, vertical posts on the corners were left exposed (Figures 9a and 11).

Projections are common architectural elements on the frontage as a balcony or alcove (Figures 8, 9 and 11). In some houses the top of the projections were arranged to form a triangular pediment (Figures 8 and 9). They were plastered or wooden covered; however, it is highlighted by a wooden floor cornice. The side facades of the projection with little depth not have windows or there are narrow windows.

Figure 11 A house in Tongurlar Village

Figure 12 A house in Kurşunlu Village (photos: authors).

In the region where the terrestrial climate is effective, the facades of the buildings were plastered with adobe plaster to protect against climatic conditions. Since the adobe is a material that is not resistant to external weather conditions, the facades and covers of the buildings must be well protected. For this reason, the eaves were extended outwards, and the structures were generally covered with hipped roofs (Figures 10 and 11).

In the district, the buildings where the lower floors were arranged as shops and the upper floors as residences, the vertical axes of the showcases in the shops and the windows in the living floors were arranged in harmony with each other. The residential floors were separated from the shops on the ground floor by a projection or a floor cornice by their function and design.

While the building facades have symmetry and order in themselves, it is another important architectural feature that the structures in the neighboring parcels were also designed in harmony. In adjacent structures with the same number of floors, a building cornice continued to the side building, and they were covered with a single roof cover. As it can be seen in Figure 13, when a two-story building was built next to a single-story building, the eave cornice of the existing building and the floor cornice of the two-story building were arranged in harmony. The roofs were planned together and arranged with gable roofs.

Figure 13 Facade arrangement in adjacent buildings (photo: authors).

Not only in eaves and cornice arrangements; it is remarkable that the buildings in the neighboring parcels continue the facade features of each other, have a similar gauge, occupancy-space, and symmetrical window arrangements. This feature shows that harmony in the settlement texture. Living, producing, and sharing in Anatolia are well-known traditions from past to present; seeing the traces of the tradition in architectural features is magnificent.

3.3. Construction Techniques and Building Materials

The construction with local materials is one of the most important factor for creating the identity of the vernacular architecture (Afshar et al., 2012, 103). The structures in the region were built on a stone masonry foundation wall. In some buildings, the stone masonry was raised up to the plinth level in order to protect the building against the water rising from the ground with capillary (Figures 12 and 13). The building materials commonly used in the region are adobe and wood so the construction systems were formed according to local materials (Table 1). Adobe is made of organic materials such as earth, clay, and straw. Adobe brick (also called mudbrick) was made with humid sandy soil and dried in the sun (Costa, 2018).

The system formed by filling rubble stone, brick, or adobe block into the wooden frame is called the wooden frame with masonry infill or "hımış" technique. Another construction system is seen in the settlement is adobe masonry. In this system, adobe blocks bonded in an alternate order side by side and on top of each other, and mud mortar was used between the blocks. In both systems the inner and outer walls of the buildings were generally plastered.

In Gölpazarı the most common construction system is "hımış" with adobe blocks. The main wooden pillars extended to the level of the floor slab and were supported by the head beam. Wooden lintels were used to prevent the props from bending against the vertical load. The adobe blocks were placed between the wooden elements in horizontal and diagonal form. The wall and floor beams were planned together in the wooden frame system. The door and window openings in the buildings were also arranged with wooden pillars, upper and lower braces. The locations of the main pillars and diagonals were determined according to the openings (Figure 14). The projections and balconies were extended outwards with wooden floor beams and supported by wooden buttresses. A frontal board covers only the wooden beams on the projections or continues along the entire facade (Figure 10); the construction systems were left open under the projections (Figures 11 and 13).

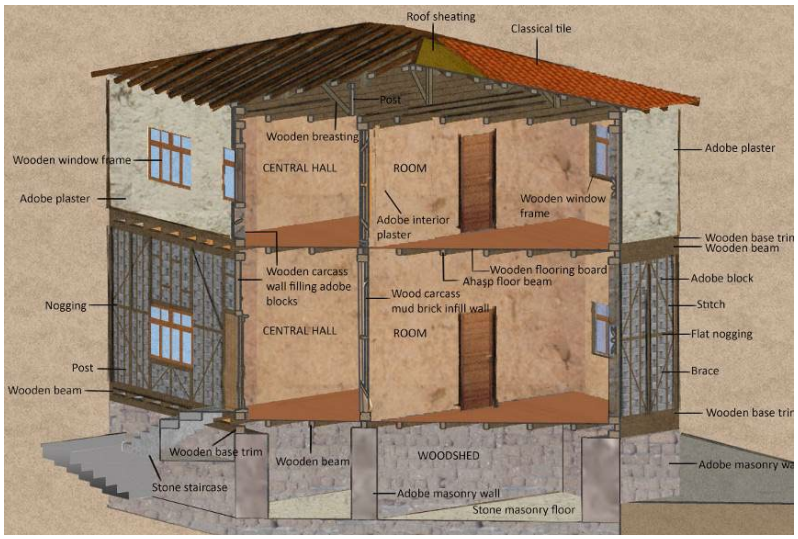

Figure 14 "Hımış" construction technique and building formation (illustration: authors).

The warehouse or barn structures were built with adobe masonry system and the interior walls were not plastered. The dimensions of the adobe blocks are differed; it is seen that the blocks were cast into molds of different sizes. Some houses also built in this system with two or three floors; the adobe walls were connected with wooden beams (Figure 15a). The wooden pillars were used at the corners of the building to strengthen the system (Figure 15b).

Figure 15 A Wooden beams and adobe blocks **b** Structure details in adobe system (photos: authors).

The wooden frame system was applied in a smaller number of buildings in the study area (Table 1). It was formed with wooden pillars and braces similar to the wooden frame and filling system, and no filling material was used. To cover the frame system and to apply the plaster to the surface, "bagdadi" laths were fixed on the woods at regular intervals (2-3 cm). There are also mixed-system structures in the region where several systems were used together.

The adobe render applied as a surface coating to protect the system against climatic conditions. The clay in the plaster has advantageous water resistance as well as its nature (Figure 14). All roofs, which were arranged as hipped or gable roofs were covered with tiles do not have a rain drainage system, and the wooden elements used on the roof were not planed, but simply trimmed (Figures 10 and 13).

Material characterization experiments were conducted to determine the properties of the adobe used in the region. Physical, chemical and mechanical analyzes were carried out on samples taken from adobe blocks, interior, and exterior plasters. Adobe is an ecological building material created with a mixture of fibrous soil, water and straw. It was determined that there was 56-60% binder (clay), 30-39% aggregate (sand), and 6-10% fiber (straw) in the plaster samples. In the adobe blocks samples the straw was not used or it is present at 1%, the aggregate ratio is 17-28%, and the amount of binder is higher than that in plasters. Compressive strength tests performed on adobe blocks gave results of 0.65-0.9 MPa (Arpacıoğlu et al., 2015).

4. Conservation Problems and Threats

Conservation is frequently seen as a technological problem because of the preservation of old materials, the keeping of venerable buildings in good repair, but conservation is a cultural problem fundamentally (Oliver, 2006). Protection and sustainability problems due to different factors have been identified in the settlement.

4.1. Immigration

The main livelihood of the Gölpazarı is farming; however, due to the lack of job opportunities in the district, local people migrate to cities. According to the data of the Turkey Statistical Institute, the rural population in Bilecik has decreased from 75% to 25% by the year 1985. While there was a slight increase in population in the center of the district in 1985-2000, the population in rural areas decreased (Başkaya, 2006).

With the establishment of the Gendarmerie Training Command in the district in 2001, economic activity started. The bazaar area became active and commercial activities developed with the military shopping from local people; facilities to meet the needs were opened, and 3 hotels and pensions were established for the accommodation of those visiting the military (URL 1). The young population, who migrated, returned due to these economic developments and the population started to increase as of 2000. However, with the closure of the command in 2013, the economy returned to its previous state, and the settlement, which gave up hope from agriculture, started to emigrate rapidly again. The newly established structures were evacuated; the facilities have remained in a dilapidated state due to long disuse.

Rural settlements remain unclaimed due to migration and as a result loss of rural heritage and natural life, rural landscape and traditional life. In Gölpazarı district, 9% of the buildings have been abandoned, 10% have used for seasonal purposes. However, it has been documented that these structures are not used for a long time in the summer and fall periods. In the villages, these rates reach 30-40% (Table 1).

When buildings which have traditional construction system are left and unattended, the damage caused by the climate and external conditions cannot be followed. If not intervened in time, the extent of the damage increases and these structures are about to collapse (Figure 16). It is observed that the mudbrick plaster has been poured into the buildings that had been neglected and not

intervened in the settlement; the wooden frame is exposed to climatic conditions, and the damage progresses in the construction system and undergoes severe structural deformations.

Figure 16 An abandoned village house (photo:authors)

It has been seen in the architectural analysis that 17% of the buildings in the district and 20-35% in the villages were damaged and are about to be lost. Since most of the buildings in moderately damaged condition are abandoned, their damage is increasing day by day, and the ones were planned to be demolished deliberately because they are in danger of occupation.

4.2. Changes in Settlement Scale

With the abandonment of the rural areas, the parcels where the demolished buildings are seen as empty land. In many regions of Anatolia, master plan arrangements in rural areas have not been completed yet and there is unconsciousness regarding the identity and traditional layers of the rural settlement. For these reasons, reinforced concrete structures are increasing gradually and even multi-story structures have started to be built over time.

The increasing number of multi-stories reinforced concrete structures in the settlement almost overwhelm the traditional low-rise buildings (Table 1 and Figure 17). The facade order and harmony of the traditional houses were not even considered as a planning decision in new buildings; window and balcony forms that do not match the original architectural texture. Moreover, each floor was arranged with different window proportions on multi-story buildings. These structures disrupt the architectural identity of the settlement with their completely different appearance and construction systems (Figure 17).

Figure 17 A multi-story building next to the house built in hımış technique (photo:authors)

There are also deficiencies in the conservation and use of monumental buildings and the preservation of archaeological sites. There are mounds belonging to prehistoric periods along with the traditional houses in Arıcaklar, Kurşunlu, and Üyük villages. Archaeological studies have not yet been carried out and planned in these areas.

Rural areas that are close to cities are also preferred for rural tourism and weekend holidays due to their easy accessibility. However, air, water and soil pollution increased, the density and unconscious interventions caused by the citizens in these areas also cause losses (Kachniewska, 2015, 513).

4.3. Wrong Architectural Interventions Done at Building Scale

With the change in living conditions and the use of modern building materials in building construction, wrong architectural interventions have been made in traditional houses (Baca et al.,2018, 202). Buildings have been adjusted in form and detail until they satisfied the demands placed upon them (Oliver, 2006).

4.3.1. Changes Made in Plan Typology

With the changing living conditions, people want to live in comfortable homes and large spaces. Therefore, the owners of the houses unite the two rooms by removing the walls or build partition walls in the sofa spaces to have an additional room. In some houses, the ground and first floors were used for different purposes or different users; rearranged the spaces, and wet areas were added to the floors; thus, the plan has become incomprehensible, and sofas have lost their characteristics (Figure 18). These interventions not only change the plan typology of the buildings but also affect the structure. The room walls of the original structure of the building are not only dividing walls but also a part of the construction system as being bearing walls. With the removal of these walls, the structural balance of the building is also disrupted.

Figure 18 The house with an edge sofa whose plan scheme was changed with the additions (illustration: authors).

4.3.2. Additions to the Buildings

The modern building materials are preferred in the repairs of traditional buildings because of their rapid availability and the insufficient recognition of conventional building materials. The traditional roof cover in the region is pantile, but during roof renovations, they partially or completely replaced with Marseille tile. In houses, it is common for the owners to renew their window joinery with PVC and entrance doors with iron doors. With the use of PVC joinery in buildings, the facade feature of the building changes completely. Depending on the needs, the window joineries were renewed partly, and then all were replaced (Figure 19).

Figure 19 PVC joinery and iron door renovation in houses

The sustainability of the adobe is difficult, which is the common construction technique of the region, so repairs were carried out with cement-based materials in plasters and masonry walls Compounds in cement are not compatible with the original building material. Also, due to its rigid structure prevents the building from breathing; thus, dispersions occur in the building material (Figure 20).

Figure 20 Cementitious repair on the masonry wall and rendering (Keep Your Village Alive Project).

4.3.3. Interventions Based on Building Comfort Conditions

It is seen that many interventions are also related with thermal comfort conditions. There is no thermal insulation material in the roof and wall systems of the buildings with adobe masonry or wooden frame system, and the original wooden joineries of the buildings are single glazed. In the region with a terrestrial climate, heat loss in buildings increases with the effect of the winter season and wind. Single rooms in rural areas heated by a galley and the difficulty of supplying hot water in wet areas do not meet today's living conditions. House owners prefer PVC joinery when renovating their wooden joinery due to their heat and sound comfort. Along with the comfort conditions, this solution is fast and economical.

Another comfort problem in buildings is that residents want to rearrange their wet spaces. Depending on the number of families living in the residences and privacy, it is preferred to use each floor separately. In this case, the toilets and kitchens on the floors have expanded with the deterioration of the plan typology and interventions have made with modern building materials (Figure 21). Original "gusülhane" and kitchen niches remain dysfunctional or even removed.

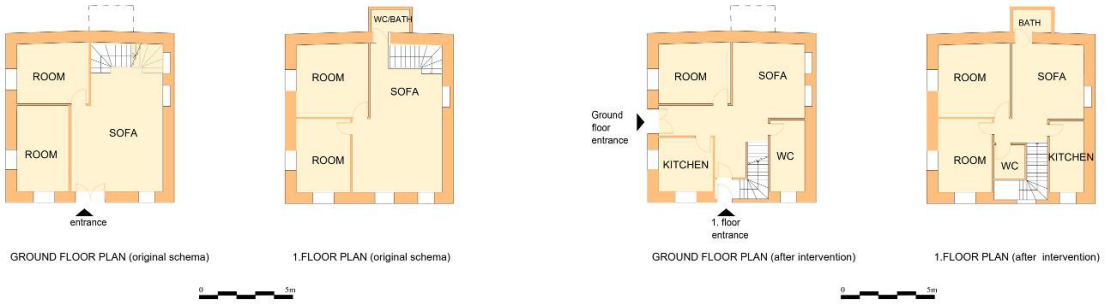

Figure 21 A house plan before and after the intervention (illustration: authors).

4.3.4.Conservation Problems Related to Materials and Construction Techniques

Adobe is a soil-based material, affected by rainwater and temperature differences so should be maintained regularly; but local people often view repair works as a burden and do not want to be involved. The damages that start as the loss of plaster in the buildings and progress towards the construction system of the building (Figure 22). Immediate interventions are important to prevent the damages to reach advanced levels.

In many buildings in the study area, the adobe material was not repaired by traditional methods, it was intervened quickly and indiscriminately with different materials. Especially the number of buildings that are severely affected by the water coming from the ground with capillarity is in majority. In this case, the water penetrating causes faster structural damage in the masonry system and wooden frame. Irreversible losses occur in the buildings, especially in abandoned, since the type and progression of the damage cannot be determined. There are many buildings in the villages with damaged and collapsed roofs. Due to the loss of plaster on the facades because of the wind, temperature differences or humidity, the building remains open to external weather conditions. The filling mortar between the adobe blocks has lost and the blocks are deformed.

Figure 22 Damages in the buildings

5. Evaluation And Conservation Proposals

Conservation and maintenance of rural architecture is essential both on a building and an environmental scale (ICOMOS, 1999). As a result of unconscious interventions, new constructions, and losses in abandoned buildings in rural areas, the original texture deteriorates. We can ensure the maintenance of the buildings by providing solutions depending on the current needs of the users, as well as the development of policies that will ensure the sustainability of agricultural and animal resources in rural areas, the evaluation of rural tourism potentials, and the commitment of people to these areas by preventing migration.

5.1. Conservation Proposals in Building Scale

The buildings have protection problems due to material and comfort conditions; periodic maintenance and architectural interventions that will provide today's needs but without deteriorating the original building gain importance.

- Adobe is the predominant construction material of Gölpazarı and ecological, but also is highly affected by climatic conditions. It is possible to ensure the sustainability of the material with regular maintenance. So that the damages that start on the outer facade of the buildings do not progress to the construction system, if necessary, repair is made.
- Some of the users may have negative perspectives on the necessity and cost of these maintenance periods. Therefore, studies have been carried out for improved adobe production (Arpacıoğlu et al., 2015). It is recommended to use appropriate additives for the material to be long lasting and to provide comfort conditions for the user.
- Prevent the rainwater by making a water isolation on roofs.
- It is important to repair the traditional roof covers in the settlement with the same material to preserve the originality of the building.
- Heat loss could be reduced by applying thermal insulation board between rafters or on ceiling boards during roof repairs (Figure 23). In buildings with wooden frame and lathed wall systems, energy efficiency on the building walls could be increased by placing suitable thermal insulation material (e.g., extruded, expanded polystyrene, rock wool foam…) inside the frame for comfort condition.

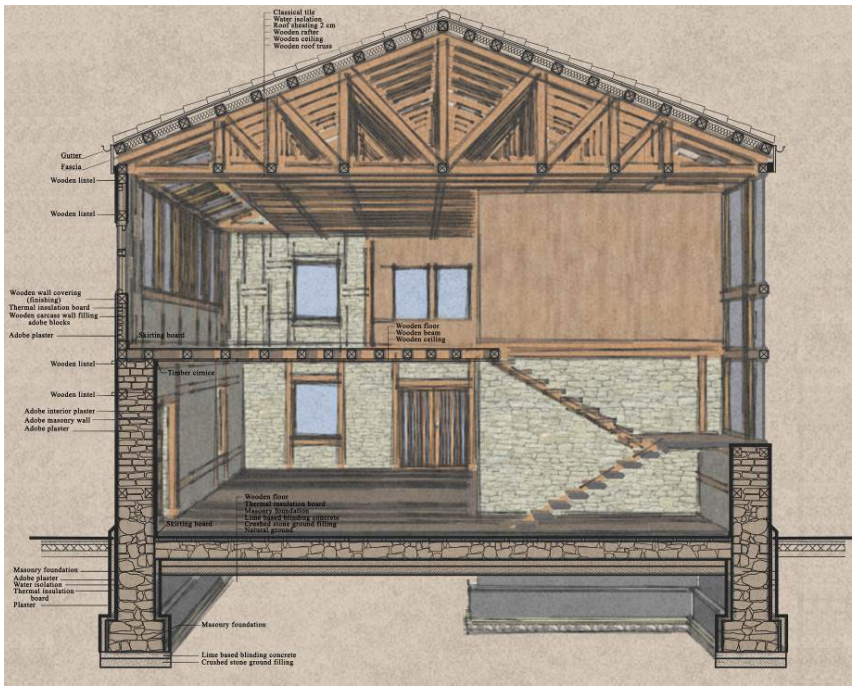

Figure 23 System section proposal that can be used in buildings to be restored (illustration: authors).

- The facade transparency rate in the traditional buildings has been determined between 35% and 45% in the settlement, and the house owners stated that they were satisfied with the sunshine in their houses. Therefore, original wooden joineries could be redesigned with double-glazing, and thermal comfort conditions could be improved (Figure 23).
- Applying restoration and reuse processes that are friendly with the environment (Baca et al.,2018, 204). Adobe is a recyclable and natural material, this should be considered as a sustainable and economic advantage. New adobe materials could be produced by reusing the mudbrick soil by the construction residues of the collapsed adobe structures. The sustainability of the material could be ensured by reconstructing with low production costs (Arpacıoğlu et al., 2015).
- While reconstructing, it is possible to design living and service areas in suitable sizes without changing the plan typology to meet the needs depending on today's living conditions. In order to keep every room warm in buildings, a stove radiator system could be installed using today's advanced industrial facilities. In this system, heat transfer could be made to the radiators in the rooms with the heating pipes from the stoves or galleys to be installed in the main living space. Thus, local materials will continue to be used as fuel.
- A similar system could be installed in wet areas or a water heater could be preferred. Hot water could also be supplied by establishing a solar energy system in regions where the climate is suitable.

5.2. Conservation Proposals and Legal Regulations for the Settlement

Maintenance and repair of buildings with traditional system or preventing the construction of reinforced concrete structures in place of deteriorated structures are important in terms of preserving the rural architecture. However, this can be achieved through cultural heritage protection programs by Ministry of Culture and National Rural Development Plan by Ministry of Agriculture and Ministry of Development (Eleventh Rural Development Plan 2019-2023).

Only 13 traditional buildings in Gölpazarı have registered as cultural properties and their ratio to the total number of buildings in the district is 3%. In the region, 207 buildings with traditional systems were identified and documented; unfortunately, 99 of these buildings have survived to the present day without losing their architectural features and the ratio of these structures to the number of buildings in the region is 35% (Figure 24).

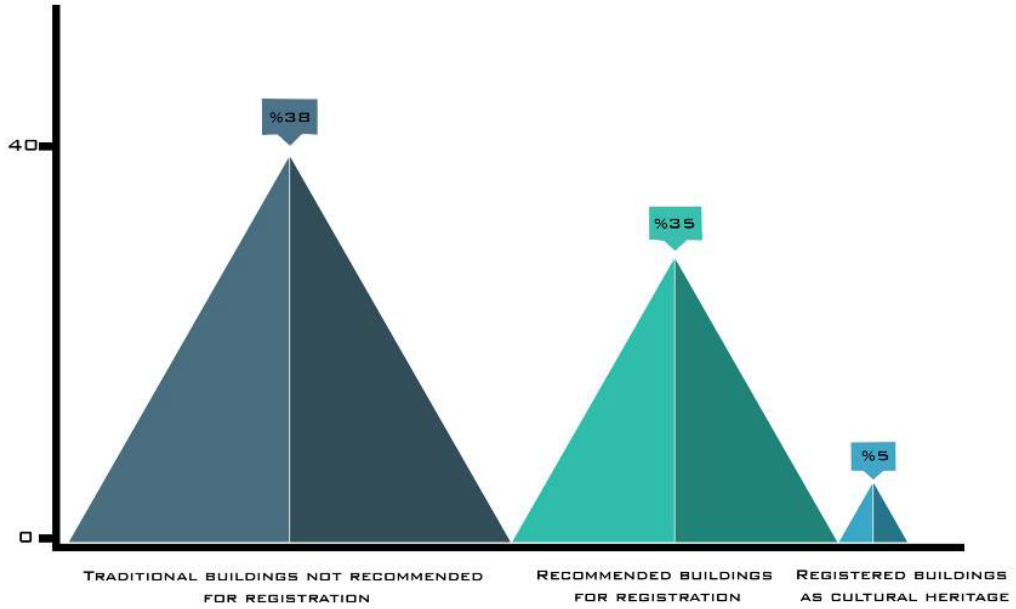

Figure 24 Diagram showing the ratio of the buildings registered as cultural property and proposed for registration (source: authors).

As a result of the analyzes carried out, although 108 buildings were built with the traditional system, it was not recommended to be inventoried as cultural heritage because they have lost their qualities or have suffered a great deal of loss. Inventorying buildings as cultural heritage is not sufficient for conservation. Conservation policies must be compatible with the rural, environment, forestry, agriculture, water, urbanization, tourism, education, energy, economy and administration development (Güler, 2019). Projects should be developed and a budget should be allocated for the protection of these buildings such as the Ministry of Culture, EU funds and TOKİ Credits in accordance with the Mass Housing Law.

Parcels of traditional buildings that have been lost, should be arranged as registered parcels in the Master plan, and new constructions should not be allowed in these parcels. Only the reconstruction of the destroyed buildings could be appropriate in these parcels with preserving the architectural features of the original building. The conservation of the vernacular heritage must be carried out by multidisciplinary expertise (ICOMOS, 1999).

It is suggested that the existing buildings with reinforced concrete systems in the region should be arranged in accordance with the silhouette. Within the scope of facade projects, the window and shop joinery of the new buildings could be arranged in accordance with the traditional houses and the facade colors could be adapted to the region. Restoration works should also be included in the annual and 5-year plans, not only at the building scale but also at the settlement scale. Participation of the public in cultural programs the need to respect the community's established cultural identity and their attraction to rural areas should be ensured and awareness should be raised (ICOMOS, 1999).

5.3. Proposals for the Cultural Tourism and Economic Potential of the Region

Rural tourism (agrotourism) is seen as a solution to problems such as local and foreign market opportunities, income for farmers, changing living standards, and unemployment. However, it provides a sustainable industry and minimum social impact (Kachniewska, 2015, 501). In the development of rural tourism, rational use of the natural and cultural heritage, development of the region's economy by small and medium-sized enterprises, mutually beneficial cooperation of the locals is required (Voinova et al., 2019, p. 249).

The region has agriculture and animal husbandry values. There is an excellent variety of products in the villages of Gölpazarı. Silkworm farming is still practiced in Üzümlü and Göldağı villages (Figure 25). Until the last few years, the participation of local and foreign tourists, the "Cherry Festival" held in Gölpazarı was celebrated with enthusiasm. Events were held in the villages and exhibitions were held in Mihal Gazi Caravanserai. Over time, the festival started to lose its enthusiasm and the cherries produced in the settlement could not be marketed. Such festivals should be encouraged and increased participation for local and foreign tourists, agricultural enthusiasts as they benefit the region both socially and economically.

Besides that, stimulate the economy, the export initiatives of the farmer should be supported. In 2018, exportation agreements started with China and Gölpazarı. It had been an active market area in the Silk Road and during the Ottoman period. Today, the neglected large market area of the district could be organized so the surrounding settlements and villages could also be used (Table 2).

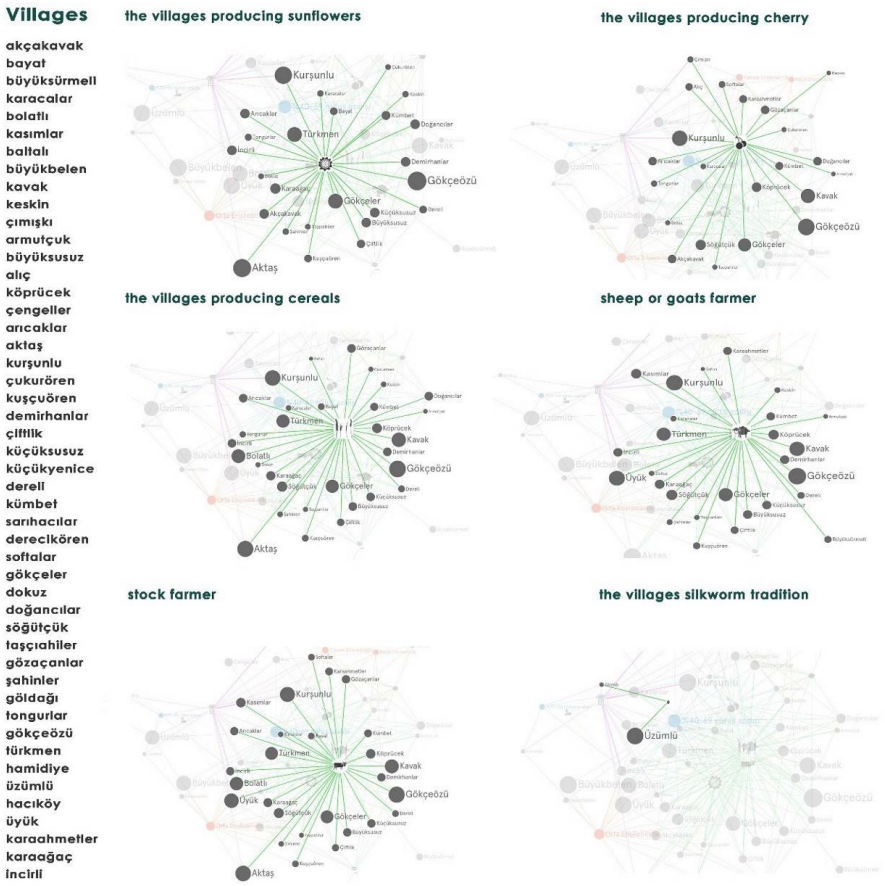

Figure 25 The agriculture and animal husbandry potential of Gölpazarı villages (source: arranged by Keep Your Village Alive Project).

Government support should be provided for agriculture and animal husbandry, by evaluating these values of the settlement, the agricultural activities based on fruit as fruit juice, jam, canned food factories would be established, and new economic initiatives could be organized in which the young population would be employed.

There are also cultural and natural values in the district. Tourists are curious about rural architecture, culture, products, and traditions unlike their urban experiences (Kachniewska, 2015, 504,505). Utilizing these values with the opportunities to be created will not only bring vitality to the region economically but will also support the preservation of rural architecture by turning it into a center of attraction. Table 2 presents recommendations regarding the potential of the region, conservation problems, and their evaluation.

Table 2 Proposals for the social, economic, cultural, and tourism wealth of the region

REGIONAL VALUES	PROBLEMS	PROPOSALS AND STRATEGIES
Architectural Heritage Values * Monumental buildings * Traditional civil architecture values and mansions	* Dysfunctional monumental buildings * Abandoned and damaged mansion and traditional buildings *Wrong interventons	* Restoring the mansions as a museum or a hotel. * New functions for traditional buildings. * Provide budget and funds for the restoration works. * Concrete constructions should not be allowed,. * Prepare the master plans * Reconstructions with local material and techniques could be appropriate.
Archeological Heritage Values * Presence of tumulus and rock tombs belongs to prehistoric times. * Existence of Byzantine bath and church ruins	* Archaeological research has not been carried out yet.	* Conservation and interdisciplinary projects could be organized. * Archaeological areas should be revealed and introduced tourism attraction centers.
Natural Values * Suitable natural areas for climbing, paragliding, trekking.	*No cultural and tourism promotions, regulations. * Unprotected natural landscape	* Private and public cooperations could be organized to promote natural life and sports. * Since Gölpazarı is close to active nature tourism areas, there is an opportunity for natural tourism.

Agriculture and Animal Husbandry Values * Exportations to Russia and China. * Silkworm potential * On the old Silk and Baghdad caravan routes.	* Decreasing exportation and commercial potential * Animal husbandry has lost its importance. * Migration due to economic problems.	* Government support should be provided. * Food factories could be established to employ the young population. * Creating new job opportunities * The "Cherry Festival" which attracts local and foreign tourists should be made permanent. * Commercial enterprises should be organized for silk weaving and handicrafts

In the villages of Gölpazarı, there are archaeological ruins of prehistoric periods, tumulus, and remains of Byzantine structures (Figure 2). The settlement also has architectural heritage values. Along with the monumental structures of the Early Ottoman period (Figure 4), there are traditional houses built with adobe building materials, which have Anatolian house plan typology and plan features reflected on the façades (Figures 8,9,10). The settlement is close to the center of Bilecik and is located on the Bilecik-Bursa, Istanbul, and Bolu-Taraklı road routes (Figures 1 and 4) should be considered an advantage. Taraklı district of Bolu is a settlement with a high rural tourism potential similar to Gölpazarı; the number of domestic and foreign tourists visiting this district on weekends, Gölpazarı can be turned into a center of attraction with Taraklı because of the advantage the transportation via Gölpazarı. It is recommended that the buildings in Gölpazarı, which are in a derelict and dilapidated condition or are about to lose their quality due to incorrect interventions, should be restored and given new functions with the budgets and legal regulations to be provided. Pavillion structures can be arranged as museums, as they symbolize traditional housing typology, and civil architectural buildings can be re-used as hotels and pensions.

The shops on the axis of the old bazaar can be restored and reactivated; local products are sold, and traditional crafts are exhibited. They can be arranged as a gathering place together with shopping. By evaluating the connection of the district center with the villages, the traditional square around Mihal Gazi can be activated with the square arrangement project (Table 2).

Figure 26 shows the relationship between the settlement with Bilecik center and surrounding districts. The settlement could be turned into a cultural and rural attraction center to be reached from Bilecik with the projects of "Bursa Bilecik Eskişehir Development Agency (BEBKA)".

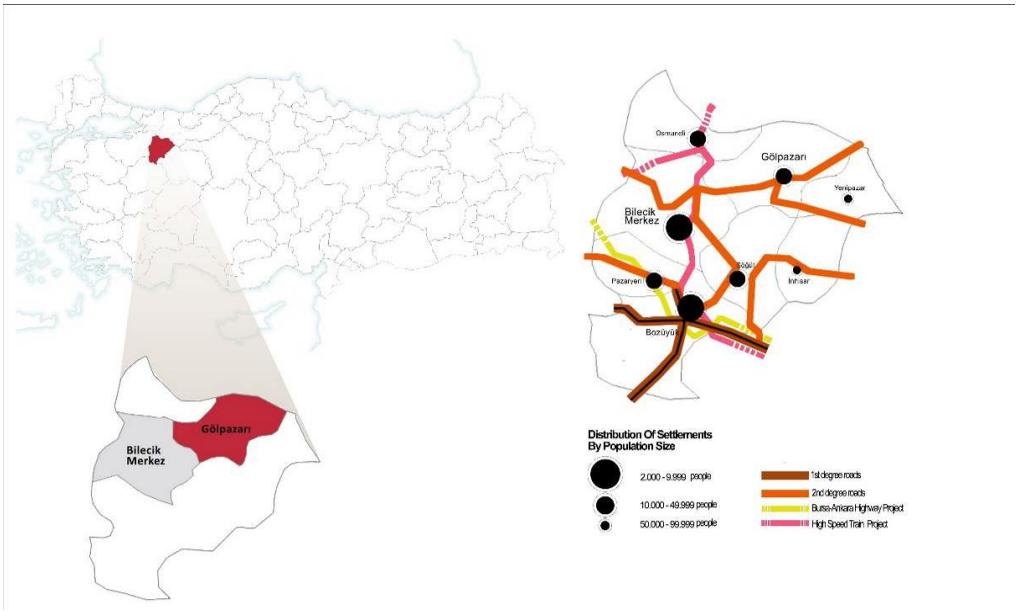

Figure 26 Bilecik and districts (illustrations arranged by Keep Your Village Alive Project).

The topography of the settlement is suitable for nature sports such as climbing, paragliding, and trekking, but the region's natural landscape still needs to be evaluated. Organizations related to nature sports are held in İnhisar and Yenipazar, close to Gölpazarı, so private and public cooperations could be organized for natural sports and tourism.

Arrangements should be developed to prevent the immigration of the local people in order not to leave rural areas unattended. In order to prevent migration from village to city, local power should be increased, and regional administration should be supported. Special measures should be developed for rural revitalization, and production forces suitable for rural areas should be increased (Council of Europe Committee of Ministers, 1973).

Natural and cultural opportunities of the rural areas should be evaluated and developed with tourism and economic policies. When a settlement becomes a center of attraction, it could manage its economic cycles. A sustainable economic structure can be created by revitalizing agriculture and animal husbandry, increasing public and private sector investments, creating new employment opportunities can be created by local characteristics of rural settlements, facilitating access to education, health, and cultural services, developing rural tourism and encouraging reverse migration.

With ensuring sustainability and re-functionalization of rural architecture by preserving; it will create an economic opportunity and also enable individuals to connect with the past in these areas socially. By increasing the attractiveness of these regions, people will be supported to move away from urban life and have periodic or permanent living spaces in rural areas.

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Resume

Dr. Gülçin Kahraman completed her undergraduate education at Istanbul Technical University, Faculty of Architecture. She received her master's degree with the thesis titled "Examination of Early Byzantine Period Horasan Mortars" at ITU Institute of Science and her Ph.D. (2017) with the thesis titled "Istanbul Fenari Isa Mosque/Konstantinos Lips Monastery Church Restitution and Conservation Proposals" in ITU Restoration program. Since 2005, she has worked as a project manager of Byzantine, Ottoman, and modern architectural structures in restoration works and surveys, restitution, and restoration projects. In academic life, she had taught as a lecturer for about 10 years.

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Exploring lost spaces towards regaining them for urban life: The case of Konya historical city center

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Abstract

The functions, values, and meanings of cities, which have been in constant change and transformation throughout history, are changing in response to rapidly changing conditions, particularly in recent times. The areas where this change can be observed most concretely are generally urban spaces. Some places in the city, which cannot keep up with this speed, may lose their structural or functional use over time and remain idle when they are not fed or equipped with suitable activities that will integrate with the environmental character and bring vitality. Therefore, within the very valuable urban land, they may become lost spaces for the city. It seems very important to regain such spaces in the rhythm of daily urban life, considering that they have strong economic, social, and physical potential, as well as being lost. From this point of view, the aim of the study is to identify the lost spaces in the historical city center of Konya, which was chosen as the sample area, and to identify the urban space(s) that should be intervened in with priority among the identified lost spaces. The Trancik method was used to find the lost spaces in the area using detailed analysis. With the help of figure-ground, linkage, and place theories in Roger Trancik's book titled "Finding Lost Space: Theories of Urban Design" (1986), both morphological analyses (figure-ground and linkage analyses) and questionnaires and cognitive maps were used to understand "place" and measure its perceptibility. The research to understand the "place" was carried out with a total of 50 people using the random sampling technique. Then, within the scope of the study, all the findings obtained from figure-ground, linkage, and place analyses were synthesized, and all lost spaces within the sample area were determined. Among these identified lost spaces, Kılıçarslan Square and its environs were determined to be the most undetected, unused, disliked, and first intervention requested by the participants. This result underlines the necessity of saving an important public space in the heart of the city from its current transition space and using it more effectively through scientific evidence. This result underlines the necessity of saving an important public space in the heart of the city from its current transition space and using it more effectively through scientific evidence. With its effective use, the area will be reintroduced to the city.

Keywords: lost space, figure-ground theory, linkage theory, place theory, Konya historical city center

1. Introduction

'Thirty sticks meet in the middle of the wheel. The small gap between them turns the wheel. The mud bowl performs its function in the void it surrounds. Doors and windows are made on the walls of a room, but the main thing that works is the void of the room. All components have benefits, but it is the void that functions.' Based on Tzu's (6th century BC) explanation of the importance of the

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void, Kuban (2013) expresses it as the simplest functional definition of physical space and states that movement or life is in the void.

The void, which has such an important function, is also a very valuable urban component for cities with a common living space. Namely, cities consist of urban voids and solids with the most general and abstract classification. These two urban components, as opposed to each other, are actually two complementary basic elements that enable each other to exist.

The presence and the ratio of one affect the other. Therefore, the completion of urban solids and voids, their being in balance, and the effective and continuous use of the relationship between them will increase the success of urban outer space and urban life and make it possible for a rich urban organization to emerge (Akarsu, 2001; Kuloğlu, 2013). Roger Trancik underlines that the relationship system creates urban spaces and gives the feeling of being surrounded by these spaces. This system is between urban voids and solids. According to him, if this relationship is provided correctly, the time-space construction can be better perceived (Trancik, 1986).

When voids and solids are considered on an urban scale, the man-made environment created by the combination of structures describes the solids, and the remaining areas describe the voids. These voids may be designed as squares, streets, courtyards, or recreation areas, or they may appear as undesigned, unplanned, and idle (Akı and Erdönmez, 2005). If these areas have emerged accidentally or unintentionally as a result of any urban change and transformation process, in some cases, it may become difficult to define them as spaces, and they may appear dysfunctional. This situation does not valid to every undesigned area. If the area has exceeded the human scale, remained undefined and dysfunctional, it has a high potential to become a lost place for the city. Furthermore, a space is considered "lost" if it lacks any meaning or belonging to its users and has not entered social memory. In other words, lost spaces are those in which people do not feel a sense of belonging or are not desired by their users.

Such areas, which have lost their effectiveness or have not been able to form at all, can be perceived as unsafe and undesirable problem areas, but they also contain potential that can be discovered and brought back to the city. In this way, they will be able to contribute to the general health, vitality, and security of cities and reveal their hidden resources. In other words, despite their negative effects on the city, such spaces have the potential to improve society's quality of life in environmental, social, economic, cultural, and visual contexts (Trancik, 1986; Bowman and Pagano, 2004; Smith, 2008; Girolamo, 2012; De Sola-Morales, 2013; Lee and Hwang, 2015). As a matter of fact, it is obvious how strong the economic, social, functional, and aesthetic benefits of such a recovery on a national and international scale are. In such cases, even the smallest improvement to the area has resulted in a significant advancement for the city. Therefore, identifying such potential areas and regaining them for the city is of great importance for future urban life. This is also important in terms of the proper and beneficial use of valuable urban land.

In this context, the main purpose of the study is to determine the areas that can be described as lost spaces in the Konya Historical City Center, which was selected as the case area in the city, and to determine the urban spaces that need to be intervened in primarily among the lost spaces. Although there are various practices on regaining to the city, there is no study in the relevant literature, especially in the national literature, on how to identify such spaces. This increases the originality of the study.

The hypotheses of the study for the determined main purpose are as follows;

- Hypothesis 1: Undefined areas where urban solid-void balance has not been formally established are at the same time devoid of perceptibility and the like, and therefore, they are lost spaces.
- Hypothesis 2: Areas that are not linked to other functional areas of the city in terms of accessibility turn into lost spaces over time.
- Hypothesis 3: Spaces that are not remembered or perceived in the city are lost spaces.

- Hypothesis 4: Spaces that are not liked, desired, or create a sense of “place” become lost spaces as a result of not being used and experienced.

Based on the determined purpose and hypotheses, the method used in the case study area was the Trancik (1986) method, the details of which are given in the section below. While the two theories of the method (figure-ground and linkage theories) were examined by morphological analyses, the third (place theory) was conducted with a total of 50 people using the random sampling technique through questionnaires and cognitive maps.

2. Urban void- Lost Space Relationship

There are numerous definitions of the subject in the research on urban voids. There are studies that define urban voids as unsafe buffer zones without any functions or borders that can host illegal activities (Jonas and Rahmann, 2015). However, there are also studies emphasizing that such areas, especially those located in residential areas, are significant potential areas for the city because they have the potential for regaining (De Sola-Morales, 2013). As a counterweight to the rigid boundaries of the artificial environment, urban voids are more flexible and offer the potential for innovation and creativity at various time periods (Smith, 2008). Therefore, the potential of the voids in the urban space, which are considered as a whole by people living in the city, where individuals interact and perform any physical action, is undeniable. Besides this, the voids in the urban environment are also important as they basically provide the opportunity for the fluid movement of people and animals, sounds and smells, as well as goods and services.

Kevin Lynch (1960) states in his book *'The Image of the City'* that there should be urban voids in terms of urban image and wayfinding, and that individuals should be able to define and fill these voids themselves. According to Lynch (1960), although urban voids are seen as disadvantaged areas, they are also urban components that give the city an identity. According to Ebner (1999), solids around urban voids are an integral part of the built environment because of the existence of urban activities and because they are a part of the urban space production process.

When the changes and transformations of urban spaces in the historical process are examined, it is seen that the movements of modernism and postmodernism have left their marks on the physical development and formation of the city. These have been quite effective in urban spaces, especially since the 1950s. According to Tibbalds (1988), while 'building' was the most important element of urban design in the modern era, 'voids between buildings' became more important than 'buildings' in the postmodern period. Therefore, it is seen that the dysfunctional and idle urban voids in the city, which were not discussed adequately in the modernism period, became more important with the understanding of "living things live in the void" that emerged in the subsequent postmodern period, and the necessity of designing such spaces in a livable way was underlined. Urban voids *(i.e., open, abandoned spaces, areas without buildings, or in-between spaces*) have been researched more extensively in the field of urban design in the postmodernist period. In this period, the conceptualization of "lost space" has been discussed more in the related literature. Trancik (1986, p.225) states at this point that *'maybe we should finally understand that history and environment are two sides of architecture, that no building stands alone, and that architectural solutions, no matter how brilliant they are, cannot overcome the limitations of the urban fabric in which they are placed*'.

The figure below shows both the processes that are thought to be effective in the change of urban space and the definitions of 'lost space' that found their place in the relevant literature in the process (Figure 1). As can be seen from Figure 1, definitions related to the concept have increased and diversified, especially after the 1970s (dead zone, empty land, residual space, lost area, unused area, void, border area, abandoned sites, dead space, abandoned area, lost space, etc.). Since each city has its own unique dynamics, it is natural that the concept is referred to using different terms (Özeren, 2012). 'Lost spaces', first put forward by Trancik in 1986 to define random areas that do not make a positive contribution to the user in terms of content, that need redesign, and are considered the current problems of cities, can be thought of as neglected areas with little

contribution to their surroundings. According to Montgomery (1998), such areas emerge as a result of insufficient use of space in an urban area isolated from the walking flow. These kinds of areas generally disrupt the continuity of the city and are not included in the mental maps of people (Nelischer, 2015, cited in Lek, 2015). Based on the definitions of many researchers, such spaces can be briefly defined as spaces that do not contribute to the people living in the city and their environment, can be of various sizes, have not been improved for many reasons, have been neglected, have not been regained to the city, are useless, empty, obscure, and residual spaces.

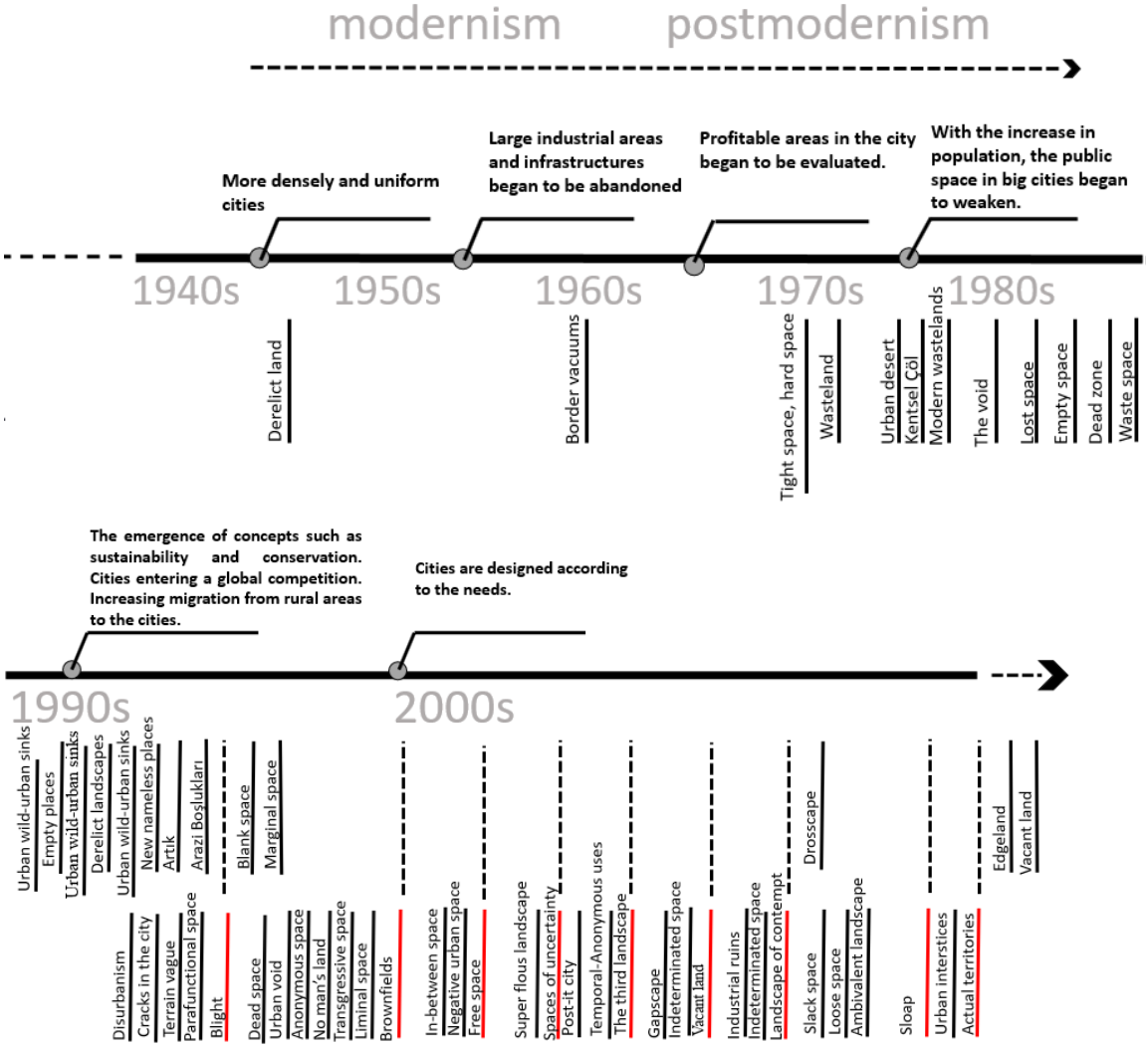


Figure 1 The stages of formation of lost spaces in the historical process and the terms used for such spaces (created by the authors based on Doron, 2007; Girolama, 2012; Boz, 2016)

Such spaces can indicate an area or a single building in the city. In some cases, however, they can also be encountered in a socio-cultural manner. For example; in public spaces where social life should be felt strongly, sometimes the loss of such feelings can also be considered a lost space for the city. For a city dweller or a tourist coming to the city for the first time, this will naturally cause different perceptions. An area that cannot be considered a loss for a tourist coming to the city for the first time can be seen as a loss for the city dweller, as it brings with it their own memories, stories, social memory, and a sense of 'place'. Therefore, it can be said that the perception of the city is also effective in the definition of "lost space" (Zarebidaki et al., 2013). In order to experience a space, it must first be perceived, and then an awareness of it should be created. Otherwise, the space will become idle over time as it is far from being experienced (Topçu and Topçu, 2012).

The lost spaces in question can also be produced in a planned manner with the gradual changes in the values, meanings, identities, and functions of the cities, which have been undergoing social and spatial change and transformation recently. The spaces that cannot keep up with the pace of

this process of change and transformation in the city gradually lose their structure and function or become unused and lost spaces and find themselves removed from urban life (Akaslan, 2006). Trancik (1986) indicates abandoned beaches, shipyards, evacuated military areas, industrial complexes, neglected parks, and marginal mass housing projects as examples of these areas. Apart from these, many other types of lost space can also be listed. These spaces can be huge parking lots in the city; areas under bridges; unused railway lines; unused courtyards in residential areas; squares that have exceeded human scale; bazaars used only on certain days of the week; seasonally used areas; unused traffic intersections, and undefined voids between buildings. In some cases, geography can also cause the formation of lost space, such as the limiting features of geographical features like rivers and hills, or the lost spaces that arise due to geographical voids created by ruggedness (Narayanan, 2012).

Roger Trancik (1986) collects the causes of lost space in 5 main groups in his study; (1) increasing dependence on the automobile, (2) the attitude of the modern movement towards urban voids, (3) the land use policies of zoning studies, (4) the reluctance of institutions to take responsibility for the public urban environment, (5) abandonment of the industrial, military or transportation places within the inner core of the city.

According to the researches, such urban voids tend to maintain their derelict status. This is mostly due to the property problems, not being able to be categorized in the common planning system, and physical conditions that cannot be improved. Such reasons also discourage new developments and lead to further abandonment. This effect may spread to the environ of the neighborhoods and cause a decrease in property values and tax revenues. Since they are lack of basic services, they can become places that threaten social security and cause significant social problems (Greenberg et al., 2000).

3. Method: Finding Lost Spaces via Trancik Theories

3.1. Description of the Design Theories of Roger Trancik (1986)

In his book titled 'Finding Lost Spaces; Theories of Urban Design', Roger Trancik (1986) cites three basic urban design theories for finding lost spaces and explains them in detail. These are (1) figure-ground theory, (2) linkage theory, and (3) place theory (Figure 2). When these theories are considered separately, it is important to indicate why the lost spaces have emerged and how to find them.

Figure-ground theory, which constitutes the first theory, means the harmonious interaction and organization of urban solids and voids. If this interaction between urban solids and voids is perceptible, defined, and complete, the spatial sequence can function successfully, and the character of the urban space is formed by establishing a spatial setup. In contrast, when the dual relationship between solids and voids is disorganized and weak, fragmented developments that are not discernible in urban space can be observed. In this case, the pieces can be separated and turned into lost spaces, and urban voids can become undefined. Therefore, Trancik (1986) emphasizes the necessity of considering the design of the object in connection with the structuring of the void and the importance of the relationship between solids and voids in the legibility of the urban space. He states that this relationship is associated with the shape and location of buildings, the design of urban equipment, and the different forms of orientation (grid, angular, linear, radial concentric, axial, and organic layout).

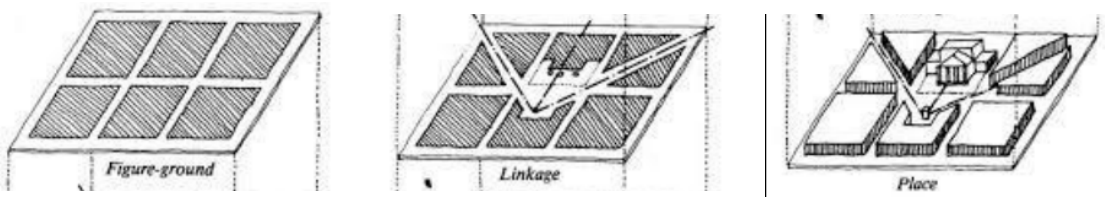


Figure 2 Diagram of urban design theories (Trancik, 1986)

One of the best-known examples of figure-ground maps is Giambattista Nolli's “Pianta Grande di Roma” of 1748 (Figure 3). This new cartographic approach by Nolli is eye-opening, instead of the old maps that show the symbols of the city, which are more art-oriented and depicted with illustrated maps. Namely, these maps are important for observing and interpreting the development of the city, especially the relationship between open space and built form. However, it also has certain limitations, as it ignores all information beyond two-dimensionality, such as topography and building height. In this theory, a figure-ground relationship is established by evaluating solid masses (buildings) as figures (black) and voids (white) as grounds, and this relationship has its own characteristics in every urban space (Trancik, 1986).

Figure 3 Italian architect Nolli’s map of Rome (Trancik, 1986)

In his relevant book, Trancik (1986) refers to the types of solids-voids in urban space, which also differ in terms of their physical and functional characteristics. According to him, urban solids can be diversified as the central and symbolic public buildings, repetitive urban blocks zoned as living, working and commercial areas, and buildings defining boundaries. Urban voids, on the other hand, are arcades and passageways between private and public spaces, the voids within the blocks, the circulation areas between streets and squares, and parks and gardens and linear open-green spaces associated with waterways (Figure 4).

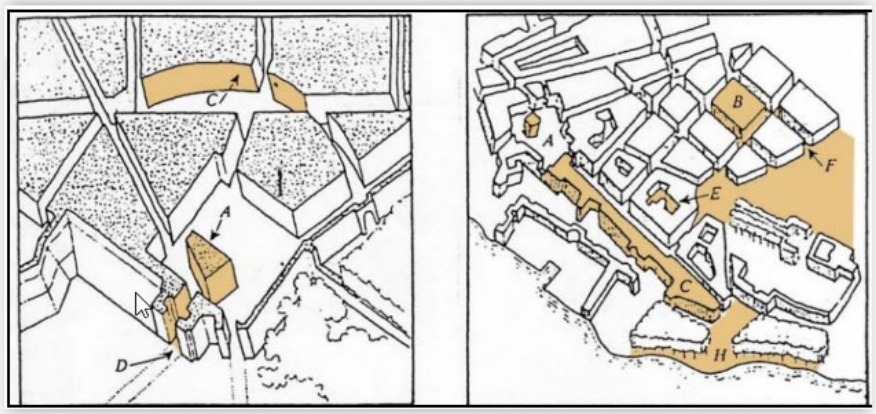


Figure 4 Distribution of urban solids and voids in urban space (A-Public buildings, B-Urban blocks, C-Boundary buildings, D-Passageways, E-Voids within the block, F- Pattern of boulevards and squares, H-Linear open spaces) (Trancik, 1986)

The second theory developed by Trancik is the linkage theory. This theory is based on the study of streets, pedestrian paths, linear open spaces, or other linking elements that physically connect parts of the city. He claims that the shape and location of buildings, as well as orientation movement in various forms, can establish the urban solid-void relationship. He suggests that six different

linkage models, namely grid, angular, curvilinear, radial concentric, axial, and organic, produce different urban fabrics and urban solid-void relationships in different combinations (Trancik 1986, Figure 5).

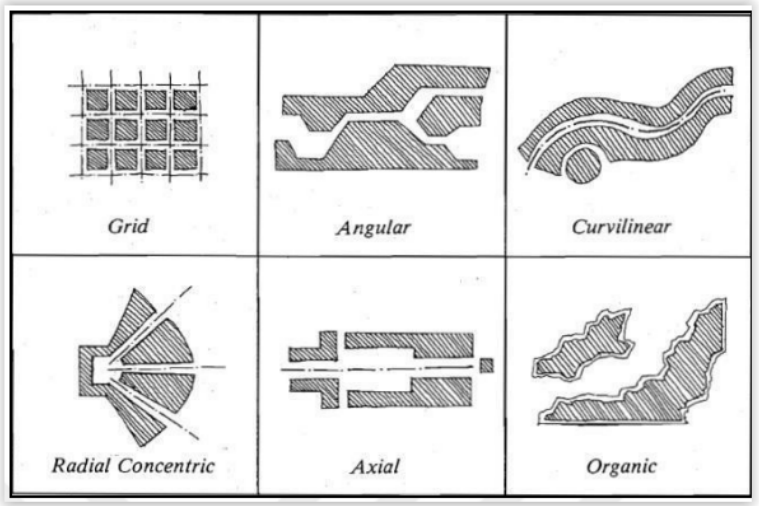


Figure 5 Linkage varieties in different typologies (Trancik, 1986)

According to Fumihiko Maki (1964), linkages mean gluing the elements of the city together. It is only through linkage that all layers of activity are integrated to achieve the final physical structure of the city (Maki, 1964). Maki (1964) cites 3 collective forms in terms of linkage; (1) the compositional form consisting of independent structures, in which the linkage is perceived indirectly, (2) the mega-form with a formally defined outer framework containing various hierarchical and interconnected functions and elements, and (3) the 'group form' which is derived from the increasing accumulation of spatially interconnected elements along an axis, and seen in the spatial organization of many historical settlements (Figure 6). All of these linkage types are important to understand the solid-void relationship in urban space.

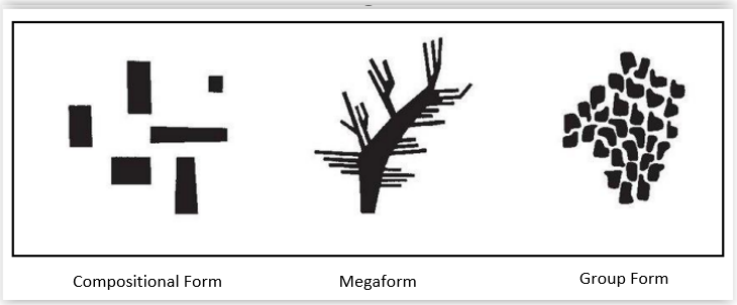


Figure 6 Fumihiko Maki's collective linkage forms (Maki, 1964)

The third urban space design theory that Trancik (1986) cites is the 'place theory'. While the concept of 'space' refers to a purely physical formation, the concept of 'place' refers to the meaningfulness of the space, because spaces are places that, beyond their physicality, consist of people's experiences and memories. In other words, a 'space' can be a 'place' if life experiences take place in it, if it causes people to experience, like, love, and feel as if they belong there. This is what is meant by definitions such as 'the spirit of the place, and ‘the sense of place' in the related literature. As Trancik emphasizes, 'people need a relatively stable place system in order to develop themselves, their social life and their culture. These needs provide the man-made domain with emotional content and a presence that is more than physical' (Trancik, 1986). Therefore, it would not be wrong to say that the spaces that are not associated with people, that are not liked, desired, and hence not used for these reasons, are also lost. According to Relph (2008), people protect and

own the places that they relate to and that have meaning. People want to protect these places, which are meaningful to them, and preserve them as they are in their memories.

Trancik's place theory is about understanding the cultural and human characteristics of physical space in spatial designs. If we think of space as a void bounded by the urban mass that has the potential to connect people and places, it will only become a place when it is given a contextual meaning derived from cultural or regional content. In addition to these, this theory also addresses user needs (Trancik, 1986).

Place theory emerges as a theory that completes the figure-ground and linkage theories. Areas with only a well-established physical structure, a balanced urban solid-void ratio, and clearly defined links will require a different approach to prevent the formation of lost spaces or find lost spaces in the city. Such approaches need to be supported by place theory, as Trancik (1986) states. In other words, a spatial pattern or an area/space that works in terms of figure-ground and linkage will emerge as a lost space if it does not contain any meaning for its users, if people do not feel they belong to that space/area, if it does not occupy a place in social memory, and if it is not used. As a result, it is important to evaluate these three theories together and consider them in relation to one another. Only with such a perspective will the designer succeed in strengthening the solids and voids of a city simultaneously, by organizing and linking, by responding to human needs, and by creating a successful urban pattern that can give the space an identity and character (Trancik, 1986).

In this context, Kevin Lynch (1960) cites three basic approaches for defining place, analyzing cities better, and implementing a more successful design: (1) *Legibility:* the parts of the city can be easily perceived and easily placed in the mind as a meaningful and organized whole; (2*) Identity:* masses and spaces are harmonious and comprehensible (3*) Imageability:* the city should be able to be experienced by people and have the perception of movement. Lynch (1960) identified 5 urban elements that were effective in the perception, reading, and imagining of urban space, thus 'making the city memorable': paths, edges, districts, nodes, and landmarks (Figure 7). The organized existence of these urban elements in the city is important in order to feel the sense of place more comfortably compared to unorganized cities. According to Lynch (1960), the user begins to perceive the city as a whole as s/he experiences the spaces s/he is in. Without experience, it is impossible to feel the sense of the place.

Figure 7 Kevin Lynch's (1960) 5 main urban elements that make the city memorable (Lynch, 1960)

3.2. Adapting Trancik's Design Theories to the Method used in the Case Study

Figure-ground, linkage, and place theories, which constitute the basis of the method, were investigated with various analyses specific to the case area in the field research section. In this content, morphological analyses of the sample area were made with the aid of figure-ground and linkage theories. In order to make more detailed evaluations in the context of figure-ground, the study area was first divided into sub-districts that differ typologically. Analysis and field observations were carried out in these sub-districts with the help of the criteria determined. These criteria were; solid-void ratio, average number of storeys, building order, dominant function of the district, functional structure of the voids, and defining solids of the district. All interpretations in the context of figure-ground were guided by these criteria. For the analysis made with the help of linkage theory, all connections within the study area were mapped, and areas where there was no

physical permeability were determined. In this regard, areas that have a higher potential for being lost spaces have been identified.

As for the questioning of the quality of the area as a 'place', questionnaires and cognitive maps conducted using the random sampling technique with a total of 50 participants who used the area were instructive. In order to have at least 80% power in the study, at least 46 participants were determined to be in the study group if the effect size was 0.40 at the alpha=0.05 significance level. However, the number of participants was increased to 50 to account for possible sampling errors. The GPower 3.1.9.4 program was used while determining the sample number. It is also worth noting that the questionnaires were conducted under the conditions of the COVID pandemic.

The questionnaires to be held in December 2021 consist of three parts. In the first part of the questionnaire, inquiries were made regarding user profiles such as gender, age, education level, occupation, and income status. In the second section, how the users experienced the area was investigated by questioning how often they used it and for what purpose they came there. In addition to this, they were asked to cite the memorable places in this area, and it was intended to identify the places they liked most and least, the areas where they used to meet, memorable street-boulevard names, the landmarks, and the spaces in the area that were perceived as either not perceived, used or not used, and liked or disliked. The questions up to this point were open-ended and did not give any clues about the answers, so the participants were not directed, and consequently, expressing their opinions directly became prominent. In the third section, the participants were asked to draw a cognitive map, as far as they remembered, in order to introduce the area. All the data obtained from the cognitive maps was then classified according to Lynch's (1960) five basic urban elements that make the city *memorable (path, edge, district, node, and landmark).* Then, the cognitive maps drawn by 50 participants were combined into a single map according to this classification. Thus, a cumulative cognitive map of the area was created. The data obtained from the questionnaires was entered into the system through the SPSS program and evaluated with the help of frequency analysis.

Then, all the analyses *(figure-ground and linkage analyses, questionnaires, cognitive maps)* were evaluated and interpreted together, and potential lost spaces that were not experienced or perceived by the users in the case area and that were imbalanced in a morphological sense were revealed. In the next stage, the area that most urgently needed intervention among these potential lost spaces was determined.

4. Case Study Findings

4.1. Case Area: Konya Historical City Center

With its central location, Konya's historical city center is an urban area that serves the entire urban population in terms of accessibility, where economic and administrative services are concentrated, and which has a high historical-cultural value. By virtue of these features, it constitutes the vision point of the city. Therefore, it is significant to increase the quality of life in this region in every aspect, and to protect and develop the area. Since each lost space detected in the area will negatively affect the identity and image of the city, the regaining of these areas to the city and their qualitative transformation is an essential step for the city.

The historical city center of Konya was selected within the scope of the study because it is the most visited area by tourists, hosts many monuments, examples of civil architecture, commercial areas, residential areas, and administrative service buildings, and has the transportation route most frequently used by the inhabitants of the city. It is prominent that this transportation axis connects the most important landmarks of the city (*i.e., Alâeddin Hill and Mevlâna Tomb*) and is one of the main physical determinants of the historical development of the city.

Some environmental effects were considered while determining the boundaries of the historical city center research area. These boundaries can be listed as follows: The western part of the research area is surrounded by Alaeddin Hill and Kultur Park. The southern part is surrounded by

the Şükran Mahallesi Urban Transformation Project. The northern part is defined by the expropriation works in Şems Neighborhood, which is one of the special project areas; the urban transformation zone and Üçler Cemetery in the eastern part of the Mevlâna Tomb. All these boundaries are shown in Figure 8a. Important nodes within the research area are also shown in Figure 8b.

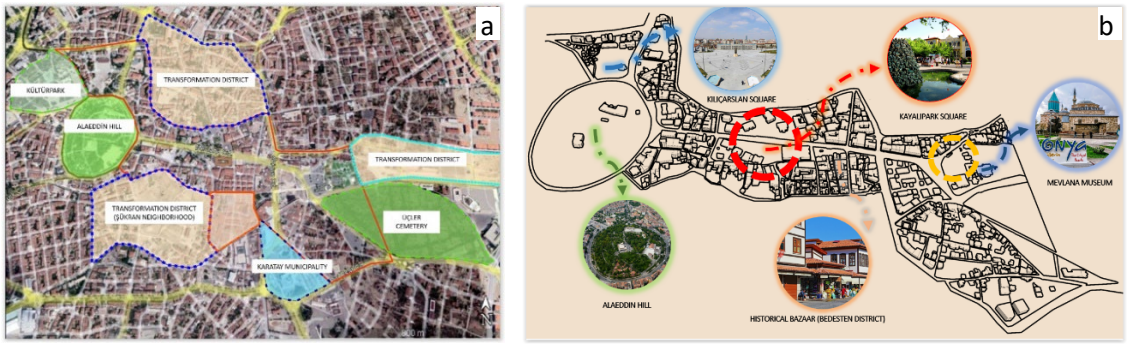


Figure 8 Boundaries of the research area (a), Important nodes in the research area (b) (Ünal, 2022)

4.2. Findings

4.2.1. Evaluations via Figure-Ground Theory

The preparation of the map for the figure-ground analysis constituted the first step of the examination of the urban fabric. Based on the classification of the urban elements that made up the urban solids and voids stated in Trancik's figure-ground theory, the urban solids and voids determined in the area were plotted on the map as seen in the figure below (Figure 9).

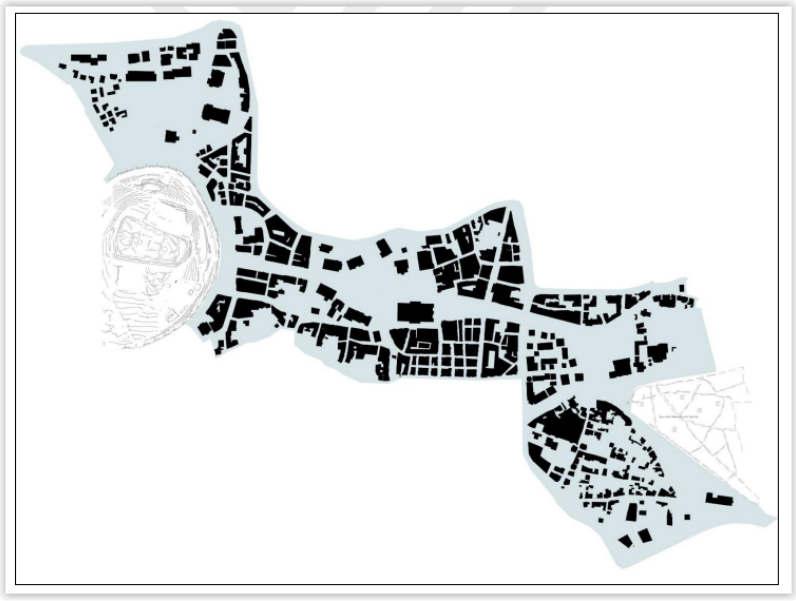


Figure 9 The figure-ground map of Konya historical city center research area (Ünal, 2022)

According to calculations made via the map, the total area of the research area is 56.7 ha. 18 ha (41%) of this consists of urban solids, and 28.5 ha (59%) of urban voids. The urban voids are mostly made up of squares, streets, parks, residential courtyards, and parking lots, while the urban solids are mostly made up of urban blocks and public buildings.When the entire research area is evaluated as a whole, it can be seen that the solids-to-voids ratio is evenly distributed. However, when the space is divided into parts, it appears difficult to talk about a solids-voids balance occurring at the same rate in each part; in other words, feeling the same balance in a fragmented spatial organization appears difficult.Therefore, in order to emphasize this situation and examine it in more detail, the case area was divided into 8 different sub-districts according to their morphological

structures. Among these districts, the C and F districts were divided into small parts to be examined in more detail as they also contain different patterns (Figure 10).

Apart from the solid-void ratio, as stated in the method section of the study, some criteria were used to evaluate the research area in detail in the context of this analysis. All of these criteria can also influence the perception of the space. In other words, the calculations made in two dimensions were evaluated in detail with the observations of the authors in the third dimension. Figure-ground analysis results are given in the figure below (Figure 11). Based on Figure 11 and the observation results, the evaluations of urban solids and voids for each morphological district are as follows;

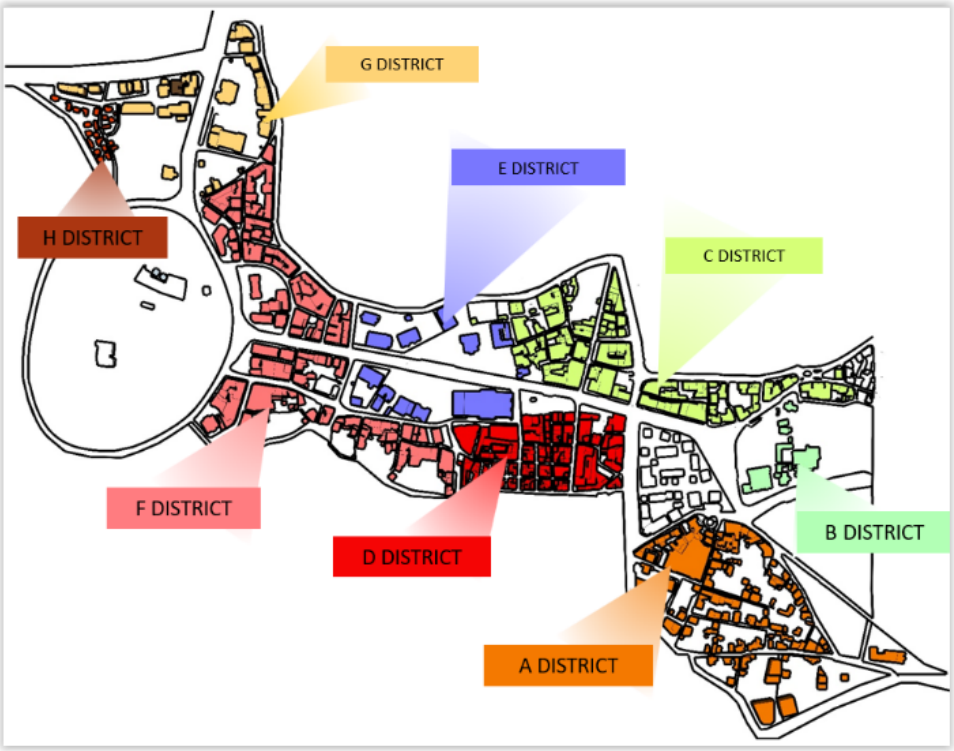
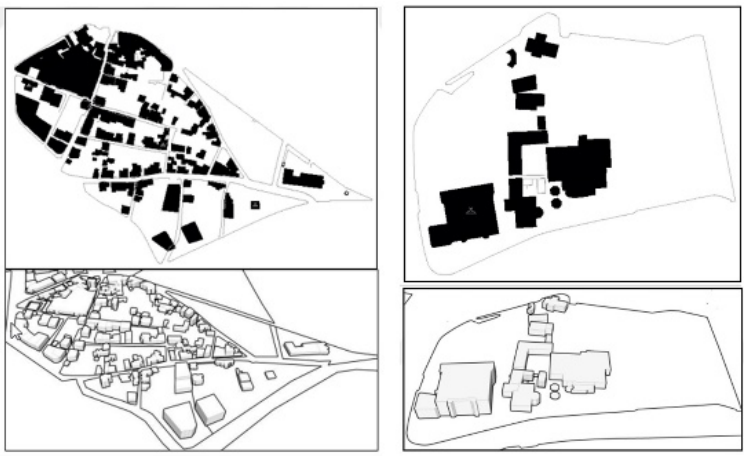


Figure 10 Districts with different morphological characteristics within the research area (Ünal, 2022)



District A District B

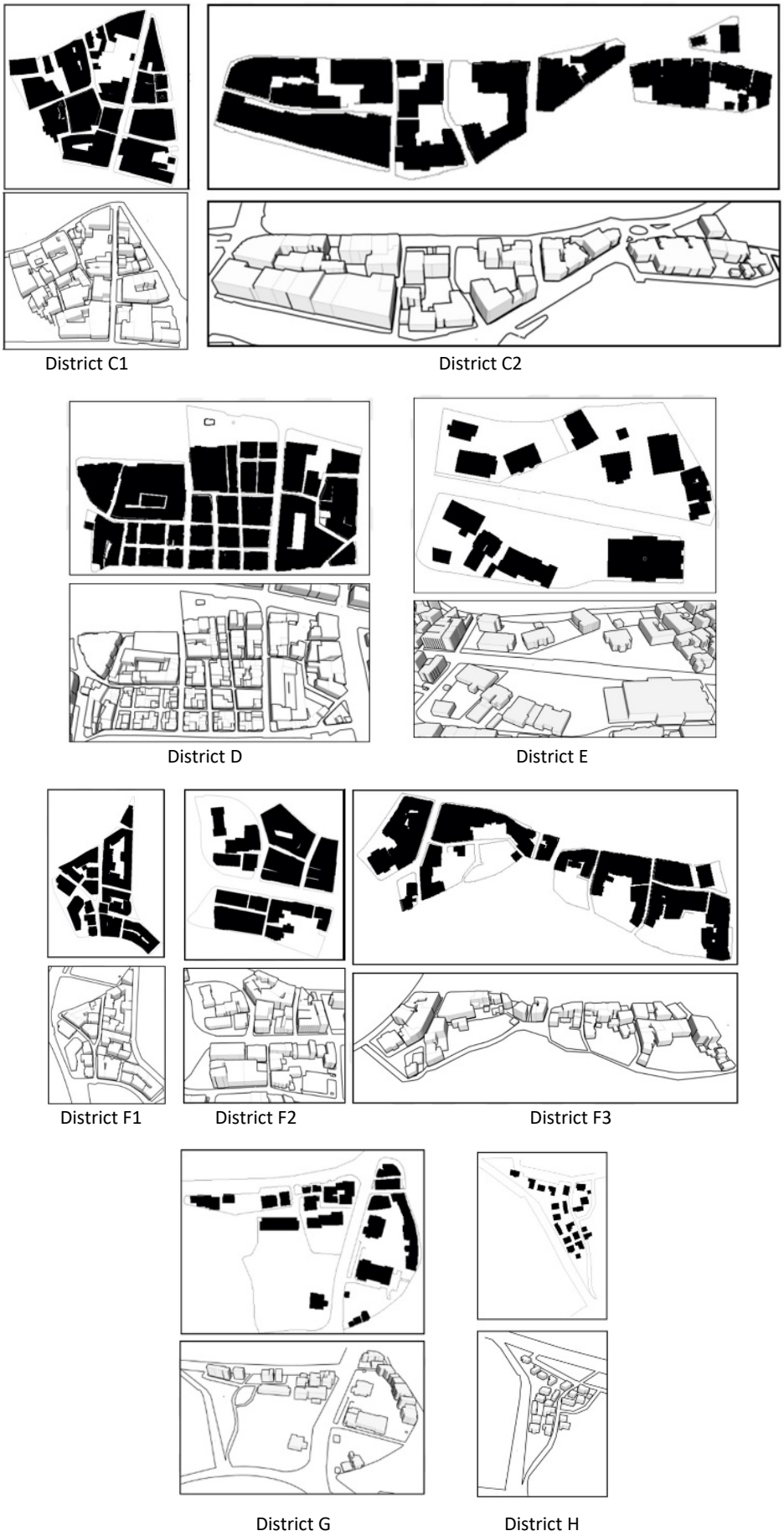


Figure 11 Figure-ground analyses of sub-districts with morphologically different characteristics (Ünal, 2022)

District A- South of the Mevlâna Tomb

- The district covers Piri Mehmet Pasha Bazaar, which is a significant commercial area, shopping arcades, historical buildings, residential areas, and public buildings. The buildings are in the form of 2-3-story detached houses, and they do not define the blocks.

- It is 9.1 ha in total, 28.5% of which consists of urban solids (2.6 ha), whereas 71.5% (6.5 ha) is composed of urban voids. Considering the solids-to-voids ratio, the district seems rather empty. While this causes the linkage between the buildings to be broken and lost spaces to be formed between the buildings, it also prevents the easy perception of the space.

-The area has become increasingly disconnected from one another as a result of the demolition of some buildings and the neglect of some sections.The neglected and undefined areas are in very bad condition in terms of environmental, social, and visual aspects and are generally used as parking lots. These areas, which are not linked to each other, are in a position that threatens social security.

- The car park next to the Üçler Cemetery is used for the buses of the tourists coming to the city and for those visiting the cemetery, and it remains idle for the rest of the days.

District B- The Mevlâna Tomb and its closer environment

- This district, which is the most visited by domestic and foreign tourists and has a high spiritual value for those living in the city, is 2.8 ha in total. 16.4% (0.4 ha) of the area is composed of solids, whereas 83.4% (2.3 ha) is void. These rates are an indication that the area does not have a solid-void balance.

- It contains very valuable urban solids such as the Mevlâna Museum, Selimiye Mosque, and Yusuf Ağa Library, as well as significant urban voids such as Gülbahçe and Mevlâna Square. The lack of sufficient landscape elements, trees to provide shade, and the absence of appropriate descriptive borders, despite the mosque and museum surrounding the square, cause the square to have a rather empty appearance. In this respect, it can be said that it is not on a human scale.

- On the other hand, the fact that the square in front of the Tomb is empty can be considered a significant asset in terms of seeing and perceiving the Kubbe-i Hadra (the Green Dome) and Selimiye Mosque from the other end of Alaeddin Street. Thus, it becomes easier to go to the Mevlâna Tomb and explore the area.

District C1 -The back sides of Fatih Market

-The area where the commercial and residential area is mostly in the form of 3- to 4-story detached buildings is solidly occupied by 44% (1.8 ha), whereas 56% (1.4 ha) is void, and in total, it covers a total area of 3.3 ha. It is seen that the solid-void ratio is balanced.

- The interfaces, courtyards of the building blocks, residential gardens, and parking lots constitute the voids.

- It is among the observations that the largest opening in the area and the voids between the buildings are used as parking lots.

- The fact that the buildings in the area are low-rise and that permeability has been allowed between semi-public, public, and private spaces has led to the formation of defined spaces.

District C2 – North Section of the Mevlâna Tomb

- 55.5% (1 ha) of the total area of 1.8 ha, where commercial areas are in the majority, consists of solids, whereas 44.5% (0.8 ha) are voids. Thus, it can be said that the solids-voids balance is good.

The area's solids are 3-4 storey adjacent urban blocks, mosques, and commercial areas, while the voids are courtyards of the building blocks, interfaces between buildings, parking lots, residential gardens, and streets.

- Since the roads linking the area are narrow, there are problems, especially regarding the access of vehicles.

- It is also among the observations that there are some abandoned buildings in the area that have become ruined over time.

- Buildings form the boundaries of urban blocks. The voids thus consist of the courtyards behind the buildings and the voids formed by the passages between the buildings. Most of these areas are used as parking lots.

District D- Historical Bedesten Bazaar

- While 58.9% (2.2 ha) of the area is occupied, 40.1% (1.5 ha) is empty and consists of a total area of 3.7 ha. The solids-to-voids ratio of the district formed in a grid texture is balanced.
- The solids consist of the shops in the bedesten, whereas the voids comprise the spaces between buildings, the streets, and the Jewellers' Underground Bazaar square.
- Most of these voids are defined with shop frontages, causing the space to be better perceived and to remain on a human scale.

District E- Kayalıpark and the surroundings of the Governor's Office

- District E, which is one of the most important focal points of the city, consists of a total area of 5.2 ha, of which 1.3 ha (25.6%) is solid and 3.8 ha (74.4%) is void.
- While the solids in this district are composed of public buildings such as Ziraat Bank, Post Office, Old Industry School, Şerafeddin Mosque, Governor's Office, İplikçi Mosque and the Central Bank, the voids comprise parks, squares, residential gardens and parking lots.
- The fact that the rate of urban voids in the area is higher than the rate of urban solids can be explained by the fact that it contains an important focal point for the city.

District F1 – Heavily residential + commercial areas

-The total area is 1.7 ha. While 1 ha (58%) consists of solids, 0.7 ha (42%) consists of voids. The solids-to-voids ratio is balanced and evenly distributed in the area. The buildings define the urban blocks.
- 3–4-story urban blocks and commercial areas in adjacent order constitute the solids, whereas the courtyards, the interfaces between buildings, and the streets form the voids.
- The transition between public, semi-public, and private spaces in the area has led to the formation of defined spaces.

District F2– Environs of Alaeddin Hill

-The total area is 3.2 ha. 1.5 ha of the area consists of solids (46.7%), whereas 1.7 ha (53.3%) consists of voids. The solids-to-voids ratio of the region is balanced.
- The building blocks are limited to three- to four-story adjacent buildings.
- The solids consist of residential and commercial areas, whereas the voids consist of parks, parking lots, residential backyards and gardens, streets, and avenues.
- The largest void in the area is actively used as a parking lot.
- The park, which is surrounded by buildings on three sides in the area, is an important meeting point for the people living in the city, as well as one of the most important transition places.

District F3- Rampalı Bazaar and its environs

- Due to its proximity to the Şükran Neighborhood urban transformation project, the F3 region is an active area that includes important structures such as the Rampalı Bazaar, as well as districts where some residential areas have been demolished and converted into parking lots, and dense commercial areas are located.
- Solids account for 45.4 percent of the total area (3.6 ha), while voids account for 2 percent (54.6%).The solids-to-voids ratio is balanced.
- 2-3-story residential areas, commercial buildings, mosques, public buildings such as the District Directorate of National Education, parking lots, residential gardens, and voids between buildings in the area constitute the voids.

- While the buildings define some of the urban blocks, the remaining voids are used as parking lots.
- The area has irregular streets due to its organic pattern.

District G- Kılıçarslan Square and its environs

- In a total area of 7.9 ha, 1.1 ha (14.4%) is solid, whereas 6.8 ha (85.6%) is void. The solids-to-voids ratio of the region is quite imbalanced.
- Karatay Madrasa, Kemaliye Madrasa, Payitaht Museum, commercial buildings, adjacent 4-5-story residential areas, the old University Rectory building, a hospital, and other public buildings constitute the solids, whereas the square, parking lots, parks, and residential gardens form voids.
- The area where the square, which constitutes the largest void in the area, is located, appears to be a meaningless big vacancy in the area because it lacks sufficient defining elements, is quite wide, and exceeds the human scale.
- Some other voids in the area are also used as parking lots.

District H – The northeast part of Kılıçarslan Square

-The area is 1.4 ha in total, of which 12% (0.4 ha) is solid and 88% (1 ha) is void. It is seen that a solid-void balance could not be reached in the district.
- Two-story detached buildings inspired by traditional Konya houses, public institutions, and a mosque constitute the solids, whereas the roads and parks form the voids.

All evaluations are summarized in the table below for easier understanding of the observation results and calculations (Table 1).

Table 1 Observation and calculation results of the figure-ground analysis

Districts	Criteria						
	Urban solid-void ratio		Average number of storeys	Building order	Dominant function of the district	Functional structure of the voids	Defining solids of the district
	Solids	Voids					
A	**28.5%**	**71.5%**	2 or 3	Detached	Mixed use	Parking lot	Piri Mehmet Paşa Mosque and Bazaar
B	**16.4%**	**83.4%**	-	Detached	Mixed use (heavily commercial and religious)	Square	Monumental buildings such as Mevlâna Museum, Selimiye Mosque, Yusuf Ağa Library
C1	44%	56%	3 or 4	Detached	Mixed use	Parking lots Voids between buildings Residential gardens	Residential buildings and shop frontages
C2	55.5%	44.5%	3 or 4	Adjacent	Commercial	Voids between buildings Parking lots Residential gardens	Shop frontages Mosques
D	58.9%	40.1%	2 or 3	Adjacent	Commercial	Voids between buildings The Jewellers' Underground Bazaar square	Shops in the historical bazaar
E	**25.6%**	**74.4%**	-	Detached	Commercial Administrative	Squares Parks Parking lots.	Ziraat Bank, Post Office, Old Industry School, Şerafeddin Mosque, Governor's Office, İplikçi Mosque
F1	58%	42%	3 or 4	Adjacent	Commercial Residential	The voids between buildings	Residential buildings, Shops
F2	46.7%	53.3%	3 or 4	Adjacent	Commercial Residential	Parking lots, Residential gardens, The voids between buildings	Residential buildings Shops
F3	45.4%	54.6%	3 or 4	Adjacent	Commercial	Parking lots Residential gardens Voids between buildings	Rampalı Bazaar District Directorate of National Education
G	**14.4%**	**85.6%**	4 or 5	Adjacent	Mixed use	The square Parking lots	Karatay Madrasa Kemaliye Madrasa Payitaht Museum,

						Parks Residential gardens	The old University Rectory building, Konya hospital
H	**12%**	**88%**	2	Detached	Commercial, Cultural	Voids between buildings	Commercial units (Konya houses)

According to the results, it was seen that A, B, E, G and H districts are imbalanced in terms of the solid-void ratio (Figure 12). However, when we look at the functional structure of the voids, it is seen that most of them have squares or large parking lots. In addition, the surrounding urban solids are usually monumental structures built in a discrete order. Photographs of some of these districts can be seen below (Figure 13).

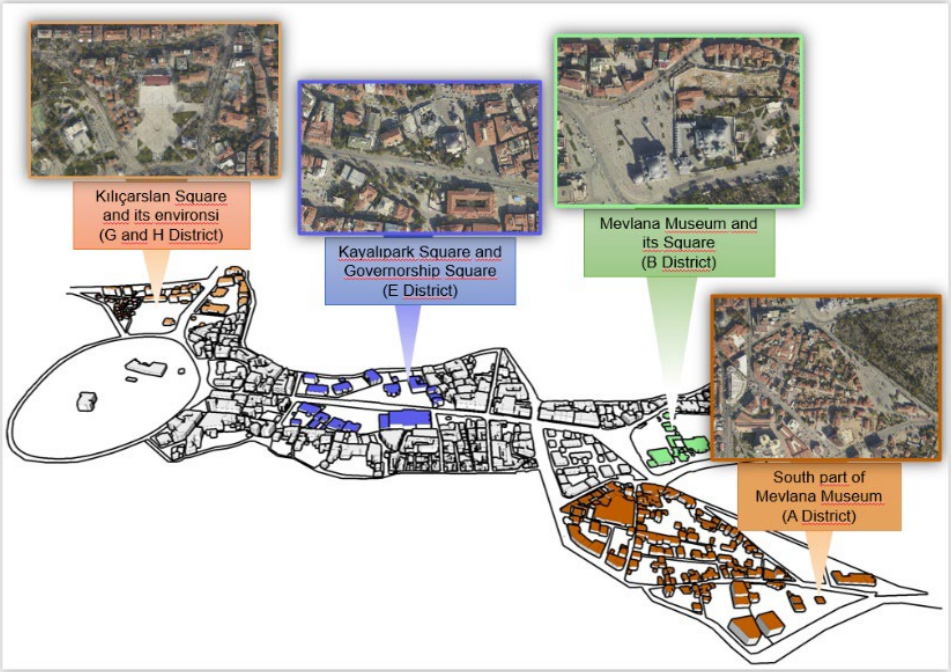


Figure 12 Districts that show imbalanced distribution in solid-void ratios according to the figure-ground analysis (Ünal, 2022)

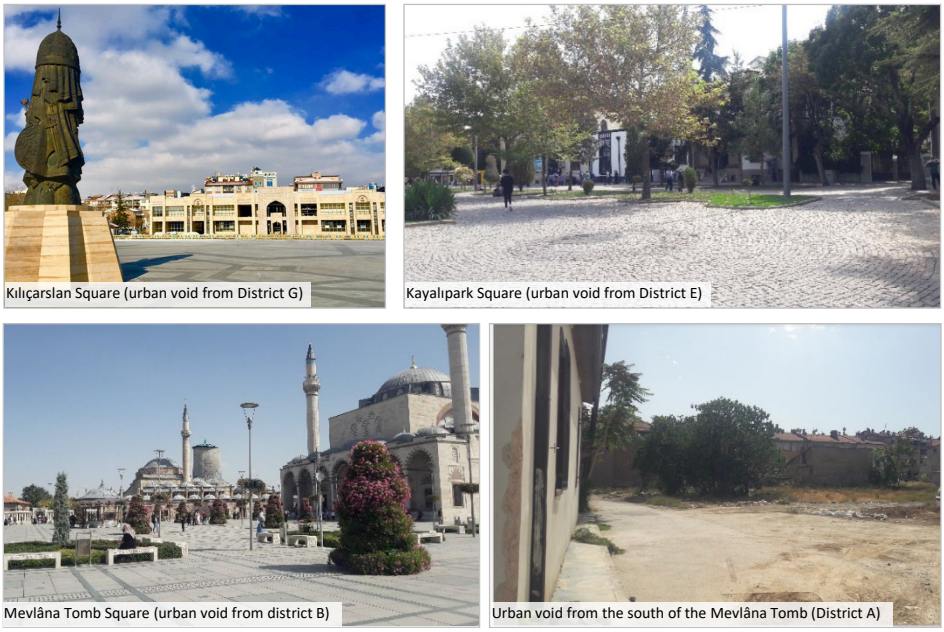


Figure 13 Photographs from the districts showing the functional structure of the urban voids (Ünal, 2020)

4.2.2. Evaluations via Linkage Theory

The streets, squares, avenues, mosque courtyards, parks, and pedestrian paths in the case area form a linkage network that connects different functions and spaces in the city. Access to public spaces, functions, and buildings is through these open spaces. The tram line serving the area reaches from Alaeddin Hill to Mevlâna Tomb and from there to the Courthouse. This line passing through the middle of the street also creates a strong border.

It can be said that the fabric of the case area complies, in terms of linkages, with Maki's (1964) group and mega form style mentioned in the previous sections. The group form is created as a result of the accumulations generated on a line in time by the elements consisting of common open spaces. As seen in the spatial organization of many historical settlements, the linkage in group form is organic and occurs as a result of a natural process. When the first stages of the formation of the historical city center of Konya are examined, it is seen that the public buildings have gradually accumulated on the Alâeddin-Mevlâna Street axis, which is the main access road through the city. The city's administrative and commercial areas are concentrated along this axis. It can be said that the sample area has an organic fabric and a group form linkage type because it was formed with the accumulations that occurred in a historical process. The reason why it also fits into the mega-form can be explained by the main determinant, i.e., Alaeddin Street, in the hierarchical order and the paths and nodes that connect to it (Figure 14a, Figure 14b).

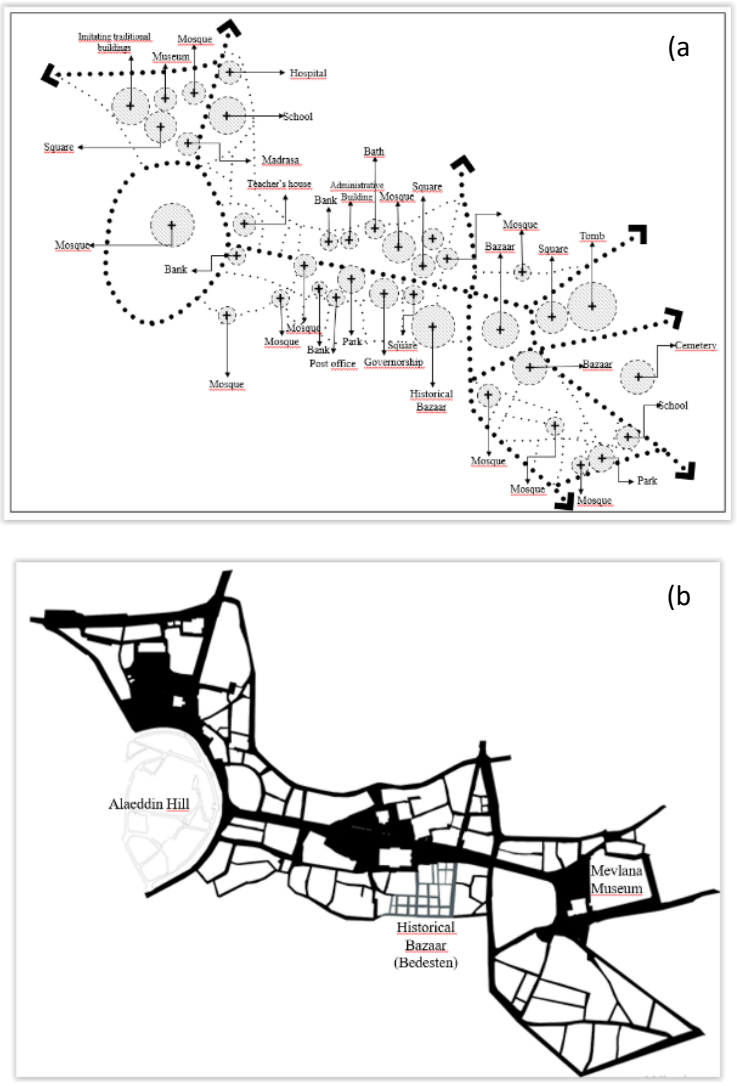


Figure 14 Representation of research area linkages in group form (a) and Linkage analysis of case area in mega form (b) (Ünal, 2022)

When the research area is evaluated according to Trancik's (1986) linkage theory, it is seen that almost all of the area poses no problems in terms of accessibility. All roads are connected with each other, and connections with parks and squares are further strengthened along the way. Due to its traditional and organic nature, some irregular streets and avenues are encountered, but they do not pose a problem in terms of accessibility. On the one hand, the tram line system on the main street increases pedestrian and vehicle circulation; on the other hand, it creates a border for pedestrians and reduces permeability. No area was found in the area where problems occurred in terms of linkage, which was inaccessible and obscure and therefore turned into a lost space.

4.2.3. Evaluations via Place Theory

After examining the textural and connectional features of the area, it is given in this section which parts of this area actually express a 'place' beyond mere 'space' to the users. In this context, the detection of districts with high or low levels of perception and appreciation provided the necessary clues for the ‘sense of place'. Understanding the city, especially in regard to the 'sense of place', will yield more realistic results through the eyes of the individuals who use and experience it. The findings obtained in this regard are extremely valuable and will ensure that the appropriate location in the city is intervened.

The results of the study in this section are evaluated in two stages. The first is the evaluation of the statistical data obtained as a result of the questionnaires, and the second is the evaluation of the cognitive map drawings in the survey questions.

Findings of The Questionnaire Conducted

According to the results of the first part of the questionnaire applied to the users in the research area, the user profiles of the people who participated in the study are given in the table below (Table 2). The fact that the majority of the respondents are from Konya (94%) is important in terms of the recognition of the area. This situation was specifically requested within the scope of the study in order to determine whether it gives the feeling of 'place' to people who knew this area. In the second part, the participants were asked about their purpose for coming to this area, the frequency of their use of it, and the types of access. As it can be understood from the table below, the purpose of the participants' visit to the area is mostly shopping and sightseeing. More than half of the participants use the area every day or once a week. The type of access to the area is usually by private vehicle or public transport (Table 3).

Table 2 User profiles of questionnaire application (Ünal, 2022)

Personal Information		Number	Percentage (%)
Age	0-18	2	4,0
	18-25	13	26,0
	26-35	18	36,0
	36-45	6	12,0
	46-55	4	8,0
	56+	7	14,0
Occupation	Employed in industrial sector	6	12,0
	Employed in education sector	9	18,0
	Employed in private sector	6	12,0
	Shopkeeper	8	16,0
	Employed in public sector	1	2,0
	Manager	1	2,0
	Security sector (Including police officers)	1	2,0
	Peasant-farmer	1	2,0
	Retired	2	4,0
	Student	8	16,0
	Housewife	7	14,0
Education	Elementary School	2	4,0
	Middle School	7	14,0
	High School	10	20,0
	Bachelor’s Degree	29	58,0
	Master’s Degree	2	4,0
Gender	Female	29	58

	Male	21	42
Income Level	0	13	26
	0-3000	15	30
	3000-5000	10	20
	5000-10000	10	20
	Higher than 10000	2	4
Residence	In Konya	47	94
	Not in Konya	3	6

Table 3 How the participants use the area (Ünal, 2022)

		Sayı	%
Purpose of coming to the area	Shopping	29	33,7
	Touring	20	23,2
	Walk	11	12,7
	Trade	4	4,6
	Education	10	11,6
	Work	12	13,9
Frequency of using the area	Every day	14	28
	Once a week	21	42
	Once a month	7	14
	Once every 3 to 4 months	7	14
	Once a year	1	2
Type of access	On foot	3	6
	Bicycle	1	2
	Private car	23	46
	Public transportation	23	46

Next, the participants were asked about the buildings/spaces that they remembered and perceived in the area. Since the question was left open-ended, a wide range of answers were received and then classified. According to the results, the places where the answers were most concentrated were Mevlâna Tomb, Historical Bedesten Bazaar, and Kayalıpark. The least perceived places were Fatih Shopping Mall and Araf Hotel. Although they were located within the boundaries of the area, the places that no one cited were Kılıçarslan Square and the Konya houses that were built recently in imitation of the traditional houses that bordered it. In addition, some small mosques and masjids were not among those mentioned (Table 4).

Following the question about perceived spaces, it was attempted to identify liked and disliked spaces and areas.The reason for this is that not every perceived area/space can instill in the user a sense of "place." Only when a person likes an area or a location can he or she assign meaning to it and feel a sense of belonging to it.The findings obtained from the answers given to this question are listed in the table below and shown in the figure (Table 5, Figure 15).

Table 4 Frequency of the participants' choice of the memorable places in the research area (Ünal, 2022)

Memorable Places	Number	Percentage (%)	Memorable Places	Number	Percentage (%)
Mevlâna Museum	48	8,1	General Directorate of Foundations	11	1,8
Historical Bedesten Bazaar	43	7,2	Old Industrial School	11	1,8
Kayalıpark	41	6,9	Souvenir Shops	11	1,8
Governor's Office	34	5,7	Kılınçarslan Square	9	1,5
Şerafeddin Mosque	30	5,0	Teachers' Lodge	7	1,1
İplikçi Mosque	29	4,9	Turkish Telekom	7	1,1
Post Office	25	4,2	Yusuf Ağa Library	7	1,1
Ziraat Bank	23	3,8	Gülbahçe	7	1,1
Üçler Cemetery	21	3,5	Banks	5	0,8
Piri Mehmet Paşa Bazaar	20	3,3	Hacı Hasan Mosque	4	0,6
Sultan Selim Mosque	19	3,2	Konya Hospital	4	0,6
Jewellers' Underground Arcade	19	3,2	Saray Shopping Mall	3	0,5
Sarraflar (Jewellers')	19	3,2	Mufti's Office	3	0,5
The Square in front of Sarraflar	18	3,0	Atatürk High School	3	0,5
Governorship Square	18	3,0	Akçeşme Elementary School	3	0,5
Mevlâna Shopping Mall	17	2,8	District Directorate of National Education	3	0,5
Karatay Madrasa	17	2,8	State Monopolies Building	2	0,3

Türkiye İş Bank	16	2,7	Araf Hotel	2	0,3
Central Bank	15	2,5	Payitaht Museum	2	0,3
Mengüç Avenue	14	2,3	Fatih Shopping Mall	2	0,3
Piri Mehmet Mosque	13	2,1	Parking Lots	2	0,3
Rectory Building	12	2,0			
Rampalı Shopping Mall	12	2,0			
			Total	**591**	**100,0**

Table 5 Places in the area the participants liked/disliked (Ünal, 2022)

		Number	%			Number	%
Places Liked	Mevlâna Museum	33	21.4	**Places Disliked**	None	14	16.3
	Sultan Selim Mosque	19	12.4		Kılınçarslan Square	9	14.5
	Historical Bedesten Bazaar	17	11.1		Environs of Piri Mehmet Bazaar	7	12.7
	Kayalıpark	15	9.8		Envirns of Şems	4	7.2
	Mevlâna Square	14	9.8		Alaeddin Hill and Its Environs	3	5.4
	İplikçi Mosque	11	7.1		Construction Sites	3	5.4
	Governorship Square	8	5.8		İstanbul Avenue	3	5.4
	Şerafeddin Mosque	8	5.8		Kayalıpark	2	3.6
	Üçler Cemetery	5	3.2		Back of Rampalı Shopping Mall	2	3.6
	Mengüç Street	4	2.6		Back of Post Office	2	3.6
	Rampalı Shopping Mall	4	2.6		Governor's Office	2	3.6
	Karatay Madrasa	3	1.9		Mevlâna Square	2	3.6
	Sarraflar Jewellers' Underground Arcade	3	1.9		Teksas Quarters	2	3.6
	Yusuf Ağa Library	2	1.3		Back of Karatay Madrasa	1	1.8
	İstanbul Avenue	2	1.3		Historical Bedestan Bazaar	1	1.8
	Gülbahçe (Rose Garden)	1	0.6		Saray Shopping Mall	1	1.8
	Teksas Bus Stop	1	0.6		Sarraflar Jewellers' Undeground Arcade Square	1	1.8
	Araf Hotel	1	0.6		Alaeddin Avenue	1	1.8
	Alaeddin Hill and Its Environs	1	0.6		Interiors of Mengüç Avenue	1	1.8

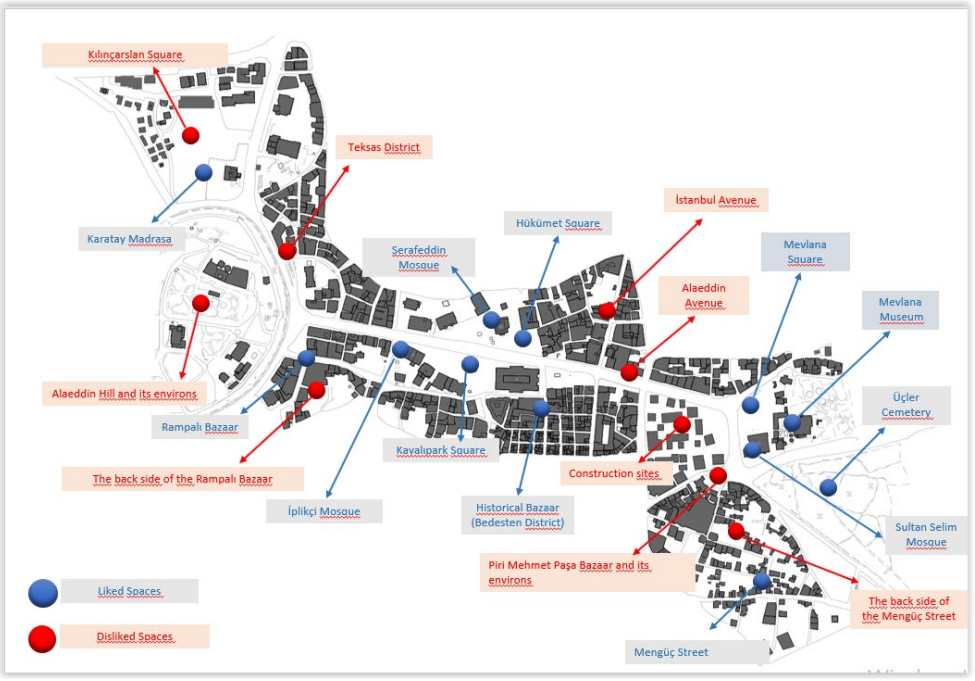


Figure 15 Places that the participants like/dislike in the case area (Ünal, 2022)

When the participants were asked about the meeting point they used the most, 32% responded that it was Kayalıpark. According to the participants, this is because the public transportation stops

are located there and it is surrounded by important public institutions. Kayalıpark is followed by the square in front of the Mevlâna Tomb (Figure 16).

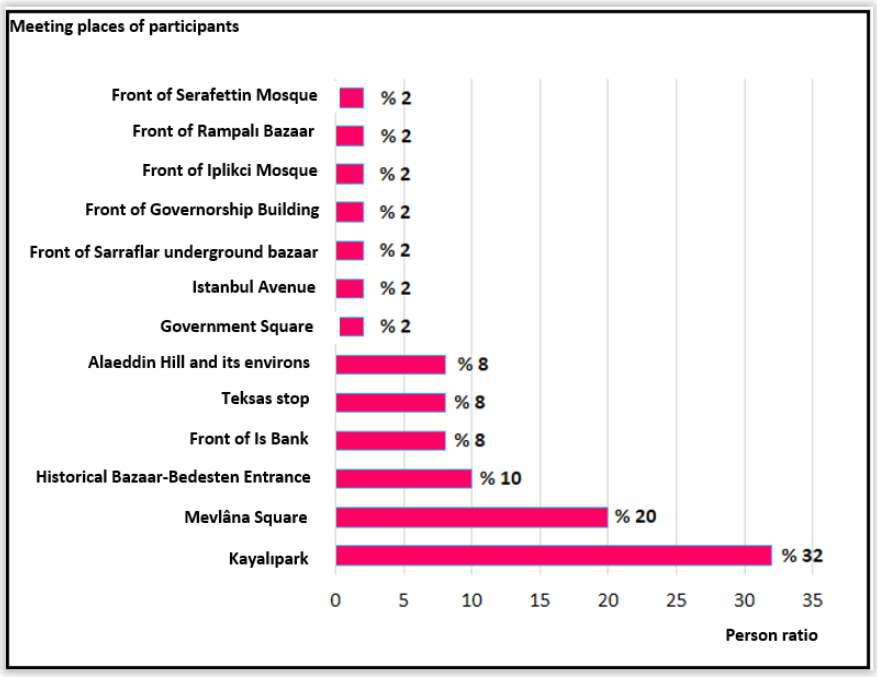


Figure 16 Meeting points frequently used by the participants in the area (Ünal, 2022)

The first landmark that comes to the minds of the participants is the Konya Governor's Office because it has a high historical value, is situated in a central location, and is also important because it is an area offering administrative services. It is followed by the Mevlâna Tomb and Kayalıpark (Figure 17).

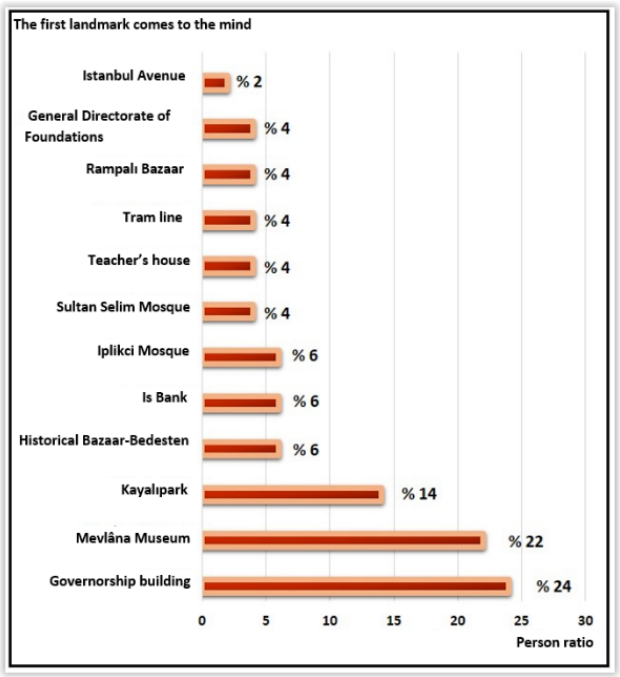


Figure 17 Landmarks primarily defining the area according to the participants (Ünal, 2022)

The respondents who participated in the questionnaire were then asked where and why they would take their guests first in this area. 70% of the participants preferred the Mevlâna Museum. They stated that the reason for this was that it represented the spirituality of Konya and that it was a place where everyone, local and foreign, wanted to go when they first came to Konya. 16% of the

participants cited the Historical Bedesten Bazaar because it was important for the city both architecturally and culturally and because it provided visitors with shopping opportunities. 8% of the participants stated that they would take them to the Şifa Restaurant first because they wanted their guests to taste the traditional dishes of Konya.

The participants stated that Kılıçarslan Square and its surroundings (32%) were the first problem spots that they would attempt to correct within the research area if they were given the authority to do so. They argued that they had difficulty perceiving this area and that the traffic was congested, especially when there was a rally. This was followed by the fact that Alaeddin-Mevlâna Street was problematic in terms of pedestrian access, and they could not walk comfortably there (16%). They stated that the tram line passing through the middle of the street caused great chaos, and the vehicle traffic while crossing the street created a disadvantage for those walking around the place. 16% of the participants responded that the excavations on Alaeddin Hill should be completed immediately, and that the newly built Alaeddin Chalet did not have a pleasant appearance. 8% of the participants stated that the Mevlâna Square should be changed because its former appearance was more beautiful, there were not enough seating elements and landscape elements, and therefore, there was no trace of its old spiritual atmosphere and spirit. 8% of the participants stated that the residences around the Mevlâna Museum were not suitable for the historical fabric, so they should be changed (Figure 18).

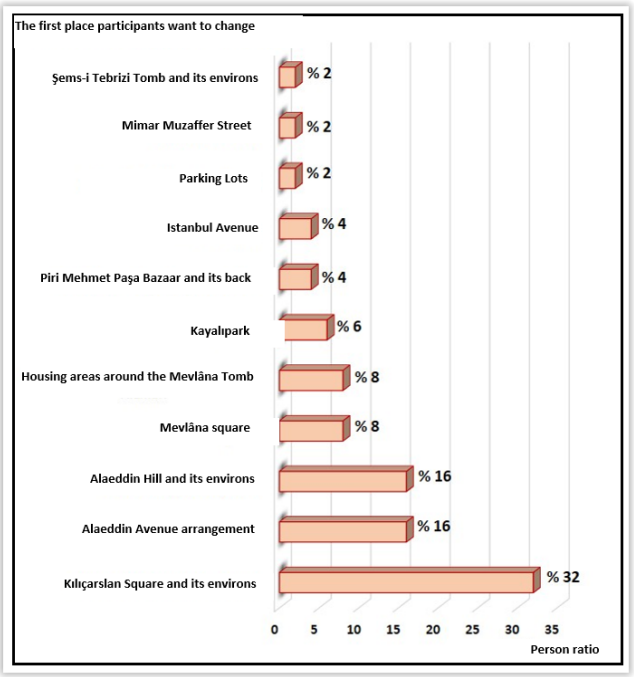


Figure 18 The first area that the participants would change if authorized (Ünal, 2022)

Findings of Cognitive Maps

It has been stated that each participant drew a cognitive map within the scope of the study to reach the places that were in their minds, apart from the verbal responses obtained from the questionnaire conducted in order to analyze the sense of "place" in the area. In making this analysis, Lynch's (1960) urban elements that 'make the city memorable', which were cited in the method section of the study, were used (Lynch, 1960). However, since some urban elements falling within the scope of "path" in the study area overlap with the "edge" elements, paths and edges are shown on a single cognitive map. Examples of cognitive maps drawn in the figure below are presented (Figure 19).

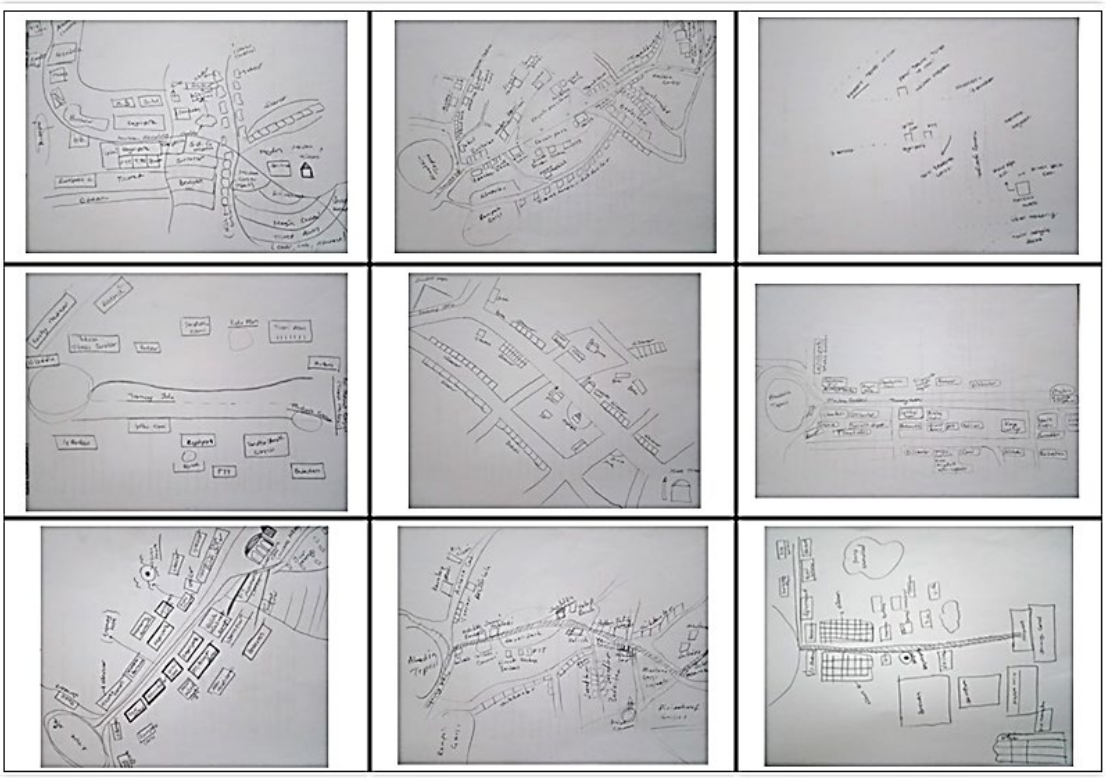


Figure 19 Cognitive map examples of the users (Ünal, 2022)

Each cognitive map was cumulatively combined into a single map in order to arrive at a collective cognitive map from the cognitive maps drawn by 50 participants.This map appears to be crucial because it indicates locations that are not perceived in the case area and are not imprinted on the memories. To obtain this map, separate cumulative maps were produced for each of Lynch's (1960) urban elements, and a holistic cognitive map was reached by combining these maps. While doing this, the percentages of the urban elements that the users pointed to in the cognitive maps they drew were used. Accordingly, the cognitive maps for each of the urban elements and the final, cumulative cognitive map covering each image element are given in the figure below (Figure 20).

According to the cumulative cognitive map obtained, Mevlâna Tomb Square and Kayalıpark are the two major landmarks in the research area. Most of the landmarks are gathered around these nodes. The landmarks outside these foci are generally located on Alaeddin Hill and its surroundings (e.g., Karatay Madrasa around Kılıçarslan Square). The basic paths indicated on the cognitive maps are Alaeddin Avenue, Ankara Street, and Istanbul Street. According to the oral responses of the participants, only Alaeddin Avenue can be considered an edge because of its weak permeability. It is also seen in Figure 18 that the area in the mind is divided into various districts.

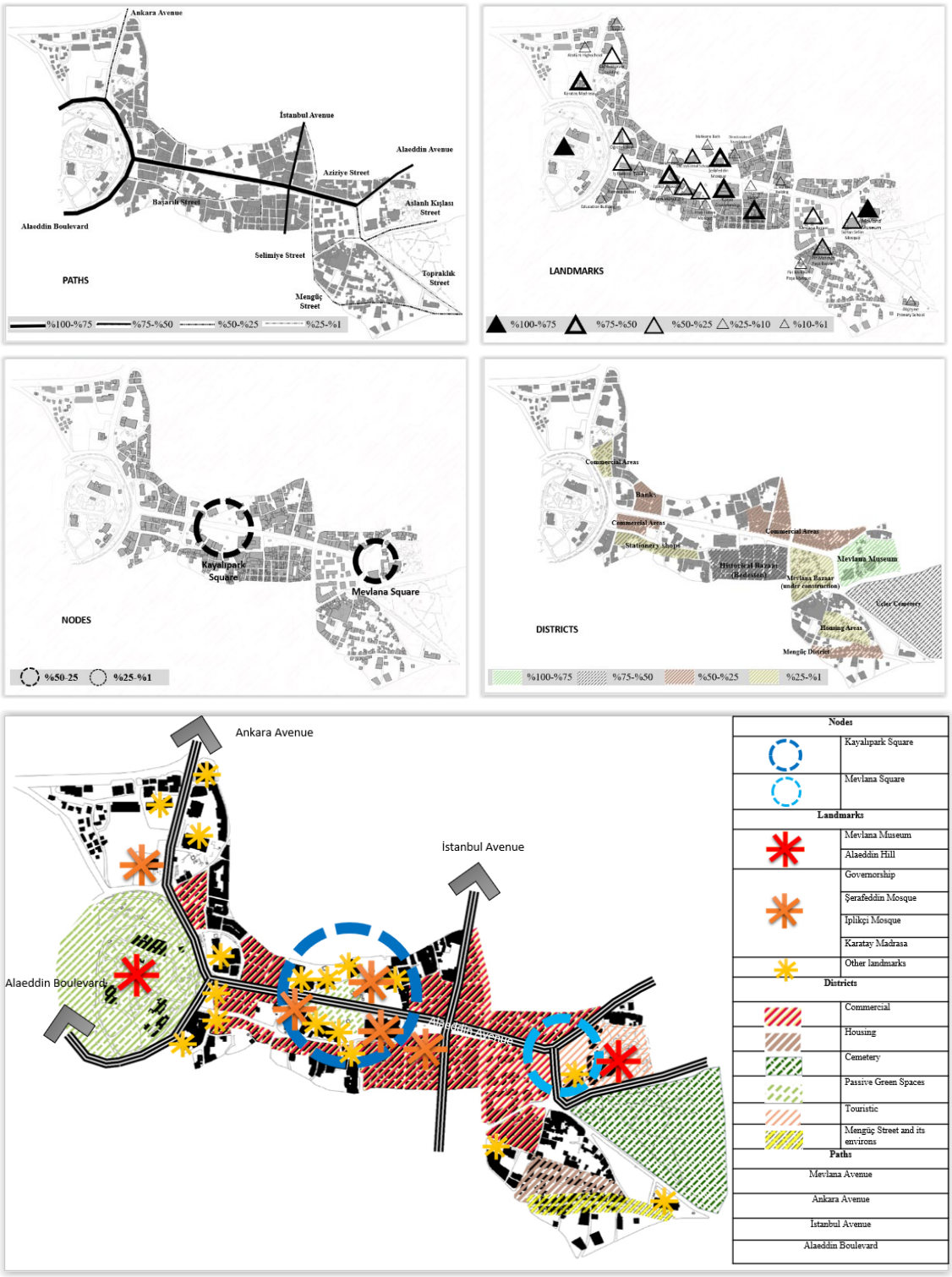


Figure 20 The cumulative cognitive map of all participants for the sample area (Ünal, 2022)

4.2.4. General Evaluation of the Findings

The findings obtained from the questionnaires and the cognitive maps drawn to evaluate the 'place' theory in the sample area were then interpreted in common with the figure-ground and linkage analyses obtained from the previous sections. Based on Trancik's (1986) figure-ground, linkage and place theory, the findings regarding the case area are given below;

The districts identified as problem areas, whose solid-void ratios and mass-ground relations were analyzed in detail by figure-ground analysis, are the A, B, E, G, and H regions in the case area. These districts generally correspond to the south of the Mevlâna Tomb and its immediate

surroundings, Kayalıpark and the Governor's Office, and Kılıçarslan Square and its immediate surroundings.

As a consequence of the linkage analysis made in the research area, it is seen that the area has an organic and a gridiron (Konya bazaar-bedesten region) feature. Due to its traditional structure, there are irregular streets at some points, but they do not pose a problem in terms of accessibility. The tram line system passing through the middle of the main street (Alaeddin Avenue) increases pedestrian and vehicle circulation in the area. On the other hand, it prevents pedestrians from moving freely as it creates a strong physical and perceptual boundary for pedestrians. In this respect, even if the main street is the most perceived and used axis, it may cause some problems in terms of accessibility. When the linkages within the study area are evaluated in general, it is seen that there is no problem in the area in terms of accessibility. All roads are interconnected, and the connections with parks and squares along the road are further strengthened.

According to the data obtained from the questionnaires and cognitive maps made in order to understand the areas/spaces that lent the quality of being a 'place' to the sample area, the Mevlâna Tomb, Historical Bedesten Bazaar and Kayalı Park stand out as the most perceived, liked, remembered, experienced, and used spaces. In particular, Kayalıpark is an area of high value with its civil architectural buildings that serve religious and administrative functions, with its position at the entrance of the Historical Bedesten Bazaar, incorporating important service areas for those living in the city, and being a center for public transportation. Therefore, its level of being experienced and perceived is also increasing. This allows users to remember and use this place more. When the figure-ground analysis of these areas is considered, it is seen that the ratios of the solids and voids and the relations between them are imbalanced. Despite this, these places are the most perceived, experienced, and easily remembered.

When evaluated in the context of figure-ground analysis, Kılınçarslan Square and its surroundings, where the rate of urban voids is quite high, are also the most unpopular places for the participants. This square, which had no place in the users' perceptions, was one of the first places that people in the city wanted to change if they were given the authority to do so.

The surroundings of the Piri Mehmet Pasha Bazaar, which is located to the south of the Mevlana Tomb, are among those that are not perceived or liked.This area, which has recently become neglected with the demolition of some residential buildings, also poses a security threat for users.

When the square in front of the Mevlâna Tomb is evaluated in the context of the figure-ground relationship, it is seen that the rate of urban voids is quite high. Despite this, it has been the most preferred meeting place. Although it may seem like a problematic area in the formal sense, users consider, perceive, and frequently experience this space as a 'place'. Therefore, it does not seem right to deem it a lost area for the city.

The urban voids left by the demolition of many buildings in the northern sections of the Şükran neighborhood urban transformation project are currently being used extensively as parking lots. Considering the density of the users coming to this area in private vehicles, one may wonder to what extent such areas could be considered a lost cause in the current situation. However, the fact that these urban spaces were not officially designated as parking lots, and the use of very large voids in the city center as car parks on extremely valuable land, is a loss for the city in terms of visual aesthetics, land use, and city quality.

The southern section of the Mevlâna Tomb and Kılıçarslan Square and its surroundings, which emerged as problematic areas in the figure-ground analysis, are also areas that are not perceived and used according to the questionnaires and cognitive maps drawn. Therefore, they should be the first areas to come to mind in the sample area in terms of reusing lost spaces. The predominance of residential areas in the southern parts of the Mevlâna Tomb and the fact that Kılıçarslan Square is an important public space serving the entire city at its most central point make Kılıçarslan Square even more prominent. It is also important at this point to note that the participants highlighted

Kılıçarslan Square and its surroundings as their least favorite place and the first place they wanted to change in the questionnaires.

Based on all these evaluations above, and if we go back to the hypotheses determined at the beginning of the study, we can test them as follows:

Hypothesis 1: *Undefined areas where urban solid-void balance has not been formally established are at the same time devoid of perceptibility and the like, and therefore, they are lost spaces*.

The findings obtained from the analyses do not confirm this hypothesis. (As with Mevlana Tomb Square and Kayalıpark).

Hypothesis 2: *Areas that are not linked to other functional areas of the city in terms of accessibility turn into lost spaces over time.*

This hypothesis could **not be confirmed**, since no problematic areas were encountered in terms of linkage-accessibility within the boundaries of the research area. The reason for this could be the fact that the area is located in a central and heavily used district. It seems likely that this hypothesis will be confirmed in other areas with accessibility problems or very poor physical permeability.

Hypothesis 3*: Spaces that are not remembered or perceived in the city are lost spaces.*

Findings from the analyses **confirm** this hypothesis.

Hypothesis 4: *Spaces that are not liked, desired, or create a sense of "place" become lost spaces as a result of not being used and experienced.*

Findings from the analyses **confirm** this hypothesis.

5. Conclusion

This study provided a comprehensive meaning of urban voids and the detrimental impact of existing urban voids on city life, based on a review of literature studies about urban voids. Although there are various studies on this subject, there is no study in the relevant literature, especially in the national literature, on how to identify such spaces. Using the Trancik design theories for finding the lost spaces increases the originality of the study.

By applying these theories into a method, this study found that the ‘place’ theory has vital importance. Places are beyond the physicality, consist of people's experiences and memories. A 'space' can be a 'place' if life experiences take place in it, if it causes people to experience, like, love, and feel as if they belong there. This is what is meant by definitions such as 'the spirit of the place, or ‘the sense of place' in the related literature. As Trancik (1986) emphasizes, *'people need a relatively stable place system in order to develop themselves, their social lives, and their culture. These needs provide the man-made domain with an emotional content and a presence that is more than physical'* (Trancik, 1986). Therefore, it would not be wrong to say that the spaces that are not associated with people, that are not liked, desired, and hence not used for these reasons, are lost.

Also, the study presented lost urban voids as a potential for the city. Such areas, which have lost their effectiveness or have not been able to form at all, can be perceived as an unsafe and undesirable problem area, but they also contain potential that can be discovered and regain to the city. In this way, they will be able to contribute to the general health, vitality, and security of cities and to reveal their hidden resources. In other words, despite their negative effects on the city, such spaces also provide vital potential to increase the quality of life of society in the environmental, social, economic, cultural, and visual contexts.

Based on the confirmation of the hypotheses, the result obtained from this study is that the lost urban spaces are more related to mental, semantic, and emotional content than their formal/morphological contents. The solid-void rates and accessibility analysis alone cannot be used to conclude that the area is lost. In addition to this, the functional structure of the urban voids (such as being an important square), the function of the urban solids that surround and define the space,

or its importance for the citizens, is an undeniable fact. Even if some urban spaces are not designed, they are not considered lost if they make sense to the city dweller. In this context, Kılınçarslan Square is the most problematic, dysfunctional area in the study area and needs to be regained to the city.

This result is a finding specific to the place (Konya historical city center) and may vary depending on the differences in the social and cultural structures in other areas to be studied.

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Resume

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Investigation of daylight performance in traditional residential buildings in the context of EN- 17037 standard - Sivas Hubiyar Korucu Mansion

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Abstract

Daylight is an integral part of our lives as the most important element in places. Efficient and appropriate use of daylight reduces the need for adequate illumination of the volumes and artificial lighting. Today, windows that are not designed correctly cause energy waste by increasing the use of artificial lighting instead of natural lighting. The seriousness of this situation is increasing today and regulations and standards regarding daylight use are published. The disappearance of this traditional Turkish architecture has also reduced the effective use of natural light. Study is focused on daylight penetration in traditional Turkish houses in the context of EN-17037 and a traditional Turkish house evaluated as case study. Natural lighting measurements of the selected building were calculated using the daylight simulation program, at 09:00, 12:00 and 15:00 for the months of March 21, June 21, September 21, and December 21 under average sky conditions. In line with the results obtained from the simulation program, the illumination levels (Lux), daylight factor (DF) and daylight performance classification (%) of the spaces are presented. As a result of the evaluation made in the context of EN 17037 standard, attention was drawn to the importance of openings as windows in traditional Turkish houses. And additionaly, architectural similarities and differences with the contemporary building is highlighted in results.

Keywords: daylight, daylight performance evaluation, EN 17037, natural lighting, traditional Turkish houses.

1. Introduction

Daylight is the most basic natural resource used to illuminate living spaces from the past to the present (Kazanasmaz, 2009). The relationship between space and daylight was the most important concept that architects focused on before the electrical lighting of living spaces (Arpacıoğlu et al., 2020). In terms of visual comfort and efficient use of living spaces, natural lighting is given priority in the designs. The design setup was made by improving the light quality and perceptibility of the spaces over time (Kazanasmaz, 2009). Daylight also affects people psychologically and physiologically (Kutlu, 2019). Its positive effects on human performance have also been proven in studies (Garris, 2004; Arpacıoğlu et al., 2020). As a result of studies conducted for many years, it has been proven that natural light has a significant effect on human physiology and that the external view from the windows can positively affect human health (Tuaycharoen & Tregenza, 2007). For

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this reason, considering all kinds of effects on people, the importance of the predominance of natural light in all spaces is emphasized in many studies (Sevinç & Altın, 2021).

Spaces that are adequately illuminated and have sufficient visual comfort are naturally preferred by people (Bülow-Hübe, 2001). For this reason, the luminous effect created by daylight attracts more attention than the unnatural image formed in the electrically illuminated space (Arpacıoğlu, 2012). At this point, an increase in the lighting quality of the space by including daylight values in the design process in the early phase of the design should be aimed. Thus, the overall quality of the project can be increased, and project costs can be reduced (Arpacıoğlu et al., 2020). This interaction between quality and cost is also an important factor in design that reduces the need for artificial lighting and saves energy. The productive and stimulating environments created in the spaces illuminated by daylight increase the comfort of the people and significantly reduce the building energy costs (Kutlu, 2019).

Tezel (2007) emphasized the necessity of accepting natural light as a building element in the design of architectural spaces in his doctoral thesis. He also stated that natural light makes important contributions to gaining different visual meanings in the space. The effect of daylight is undeniable as much as the importance of the material effect in the shaping of the spaces. For residences at the design stage, setting up parameters such as orientation and location with predetermined correct lighting systems and predicting the lighting requirement in advance play an important role in reducing energy consumption (Sümengen & Yener, 2015). In this case, it is very important to use lighting systems designed with the right techniques. The role of natural light in mass and facade design is critical. The use of these architectural elements with high performance in terms of energy saving should be preferred at this point (Kutlu, 2019). The most known and traditional of these systems are the methods used as windows and skylights. At the same time, there are alternative usage methods such as light tubes, which are developed with today's technology and increase the dominance of daylight in spaces (Sevinç & Altın, 2021).

2. The importance of natural lighting in buildings

The windows of the buildings play the biggest role in taking natural light into the interior. Through the windows, natural light can be brought in vertically or horizontally. The natural light entering the building from different directions affects the facade design and identity of the space; guides the determination of the number, size, design, and location of windows (Tezel, 2007). Windows openings are the most important facade element that allows daylight to be taken into the interior and to establish eye contact with the exterior. The analysis and design of these openings is very important for both increasing the quality of the space and user satisfaction (Kılıç & Yener, 2018).

Bülow-Hübe (2001) states that if daylight is designed and used correctly, it can replace artificial lighting and be considered as renewable lighting. *Trengenza & Mardaljevic* (2018) argued in his study that windows affect much more than daylight. For example, in building design, windows affect not only energy use, but also conditions such as acoustics, thermal balance, ventilation and viewing angles. The main function of windows is to provide sufficient natural light to enter the space and to establish visual contact with the external environment (Bülow-Hübe, 2001). In the past, the purpose of these window openings was only to take natural light into the interior, but later on, they were shaped according to the needs of the residents in terms of comfort and psychology, and the functionality (Yıldırım et al., 2018). *Ayssa* (1996) emphasizes that features such as vision, lighting, ventilation, protection and privacy are functions of the window. In the study, *Ayssa* (1996), also argued that these functions are shaped according to needs and vary according to cultural, social and environmental factors, and these variations are even caused by floor differences in buildings. As time progressed, window designs began to be created according to their aesthetic appearance rather than their functions. This situation prevents adequate sunlight to be taken indoors (Murt, 2006). The fact that the number and dimensions of windows are not designed in accordance with energy use also causes a decrease in the heat energy gained by the buildings from the sun (Turkish

Ministry of Environment and Urbanization, 2016). While the number and dimensions of the designed windows increase the daylight efficiency in the space, the extra designed windows bring glare problems in the space (Arpacıoğlu et al., 2020). For this reason, it is recommended to use daylight simulations to make these indoor illuminances analyzes at the early stage of the design (Alhagla et al., 2019). Window designs created with aesthetic concerns instead of making maximum use of daylight in residential designs prevent natural light from entering the volumes sufficiently and cause an increase in the use of artificial lighting. This situation increases energy use and creates a negative situation in terms of energy saving (Gezinmez, 2019). When the important examples in history are examined, many details, from window designs to the orientation of the building, are considered important to benefit from daylight as much as possible. Unfortunately, this situation lost its importance later on (Kutlu, 2019).

3. Standards used in evaluation of daylight performance in buildings

Over the last century, the active use of natural light in spaces has decreased with the increase in the number of residences and the energy use opportunities in buildings (Mardaljevic & Christoffersen, 2013). With the decrease in the use of natural light, the sustainability perception of the building has improved and the need for studies involving changes in the concept of architectural space has emerged (Sevinç & Altın, 2021). For this reason, directives regulating the correct use of daylight in buildings have been prepared (Şener & Ünnü, 2011). The minimum conditions of daylight suitable for building occupants, together with public controls, are defined by mandatory standards (Trengenza & Mardaljevic, 2018). The use of renewable energy has been widely accepted in the world, and recommendations, standards and regulations encouraging the design of energy-saving buildings have begun to be published (Mardaljevic et al., 2009; Mardaljevic & Christoffersen, 2013). These standards and regulations aim to realize the potential of energy conservation in buildings, develop energy efficient policies and increase the demand for these designs. At the same time, it aims to protect and increase the satisfaction quality and well-being of those who use the spaces (Erlalelitepe et al., 2011). Considering the conditions of each country and region, the requirements for minimum or maximum values of lighting energy are determined (Turkish Ministry of Environment and Urbanization, 2016). EU countries have conducted studies on energy efficient designs in buildings and published the Energy Performance Regulation in Buildings (2002/91/EC) in 2002. According to this regulation, the required amount of energy has been determined and a common method has been adopted for the evaluation of energy performance in buildings (2002/91/EC; Sümengen & Yener, 2015). Following this regulation, the EN 15193 "Energy Performance in Buildings – Lighting Energy Requirements" standard is published, and the energy performance of the building is calculated over various variables (EN 15193, 2006; Şener & Ünnü, 2011). "EN 12464-1 European Standard" was approved by the European Standards Committee (CEN) in 2002 in order to provide the required illumination level in interior spaces with different functions (EN 12464-1, 2011; Baskan & Aş, 2021). The standard (AS/NZS 1680.2.3, 2008), which was prepared jointly by Australia and New Zealand in 2008, is accepted due to the indication of the illuminance levels needed in the buildings. In the standard (DIN 5034-4 standard, 1994) put into effect in Germany, the illumination levels are adjusted according to the functionality of the spaces (Bayram et al., 2020). Moreover, according to the IES handbook used in the USA, the illuminance levels in buildings are regulated depending on many parameters such as the ages of the people using the space (Arpacıoğlu et al., 2020).

Turkey, on the other hand, follows EU countries and implements regulations on energy use by bringing new legal regulations with similar approaches (Turkish Ministry of Environment and Urbanization, 2016). This regulation is the Energy Performance Regulation in Buildings (BEP-TR, 2010), which was prepared in accordance with the country's conditions in 2008 in line with the "EN 15193 Standard". In this regulation, lighting energy performance is calculated by proposing a general calculation method for residential buildings (Sümengen & Yener, 2015). Adhering to the "EN 12464-1 Standard" published in 2002, TS EN 12464-1 standard was accepted by the Turkish

Standards Institute in 2013, and definitions and limits were expressed regarding indoor lighting (TS EN 12464-1, 2013; Arpacıoğlu et al., 2020). This standard is valid for buildings with different functions such as educational buildings and is for artificial lighting conditions. In addition, it covers the rules that meet the visual comfort and performance needs for indoor users (Bayram et al., 2020).

With the increasing interest in healthy design practices and the need to raise standards, the fact that daylight has become a more standard practice has enabled the EU to develop EN 17037. For the use of passive systems, namely natural lighting, in buildings, EN 17037:2018 European Union Standard was put into effect in 2019 (EN 17037:2018). This standard includes the necessary criteria and methods to meet the needs for visual comfort in buildings (Yılmaz, 2019). According to the standard, the daylight performance in the space depends on the building design as well as the climatic conditions of the area where the building is located (Christoffersen et al., 2017). The TS EN 17037:2019 standard has also been developed according to the conditions of Turkey, and it is aimed to provide sufficient daylight level in residential buildings (TS-EN 17037, 2019). This proposed standard presents daylight evaluations with two different evaluation methods as 'daylight factor' and 'detailed daylight modeling' (Yılmaz, 2021).

4. Natural lighting in traditional houses

Various contemporary methods have been developed to reduce the energy used and to bring natural light to indoor spaces where daylight is insufficient. Variables such as the orientation of the building, climate and usage hours can be designed with the right strategy and energy savings can be achieved (Yener, 2007). Although it is not difficult to benefit from daylight at the desired level, it is also necessary to integrate many factors together for the use of natural lighting in spaces (Kutlu, 2019).

The effects of daylight on humans and the body's need for sunlight are a well-known fact. There are the necessary daylight calculation and measurement tools in order to make all the necessary arrangements in the spaces. However, since the measurements are not made by experts, they cannot be calculated correctly, causing the buildings not to receive enough daylight (Trengenza & Mardaljevic, 2018). This situation not only has negative effects on human health, but also increases energy consumption in a country. Of course, this situation depends on different cultures, climates, solar activity, lifestyle, etc. varies according to the variables and can affect the architectural design of the building (Murt, 2006). For example, the effect of daylight on spaces can be controlled with the help of architectural elements in some traditional Turkish houses (Yüksek & Esin, 2009). In her thesis of traditional Gaziantep mansions, Gezinmez (2019) discussed that most of the lighting is provided from the window openings and the moonlight can be taken into the interior at night through the pigeon window. Another variant of this architectural element in the thesis, which is used depending on the culture and geography variable, is seen in traditional Yemen windows. There is the lower part (Taqah) defined as the window opening and the fan light (Cabin) which has a similar function to the pigeon window. This window element provides a small amount of daylight to the living space when the shutters of the lower part are closed (Ayssa, 1996). Ayssa (1996) states that the number of windows on the south facades of these traditional buildings has been increased in order to benefit adequately from daylight. In this way, natural lighting and ventilation needs can be met without energy consumption. At the same time, the intake of natural light indoors throughout the day also reduces the amount of energy required for heating of the volumes (High & Esin, 2009). For example, this situation is seen in the traditional Gaziantep mansions that Gezinmez (2019) examined in her thesis. The window layouts of the two mansions chosen within the scope of this study vary according to the floors. Accordingly, it was determined that the size and number of windows on the upper floors were higher than those on the lower floors. This difference is due to

the increase in the need for natural light for the upper floors, as the lower floors are the service floor, and the upper floors are the living areas. In the thesis, thanks to this feature seen in Anatolian traditional houses, natural light is taken in according to the functions of the spaces. In other words, it is important to determine the functionality between the building spaces according to the intensity of natural light while designing the design. A similar situation is encountered in some traditional Yemeni dwellings. Ayssa (1996) examined the components of the traditional Yemeni window and the interior comfort. For the local residence examined in this study, Ayssa (1996) argued that only small windows with small slots providing ventilation were placed on the ground floor. On the contrary, Ayssa (1996) observed the windows reached the maximum size in order to provide ventilation, lighting and vision on the upper floors. In other words, window sizes vary according to the functionality of the spaces.

4.1. Sivas traditional Mansions

It is possible to define Sivas traditional mansions selected within the scope of this study as Turkish houses. They are the Ottoman heritage houses that have survived from the 17th century. The one-floor housing type with an outer sofa in the 15th century developed into traditional duplex houses with an inner sofa (Sivaslıoğlu, 2015). According to the cultural and geographical differences of the Turkish people, plan type, overhang, building material, number and dimensions of windows etc. Differences can be seen in many architectural formations. Despite these differences, the architectural language and character of Turkish houses are clearly evident (Sagın, 2014). When we look at the facade setup of Turkish houses, it is seen that the ground floors consist of shallower walls compared to the upper floors, on the contrary, the gaps in the upper floors increase in order to establish a view with the external environment (Küçükerman, 1995; Sivaslıoğlu, 2015). The facades have been enlivened by the overhangs on the upper floors and the increasing number of windows. The window forms formed on the facades over time ensured the formation of integrity with the urban texture. These window models, designed in double rows, can be opened and closed with the large opening at the bottom, and the small spaces at the top are skylights designed for lighting and decoration. Windows are mounted on the outer surface of the walls in order to expand the space (Sivaslıoğlu, 2015). Accordingly, the Sivas traditional houses' architecture are also shaped in line with these interactions (Figure 1).

Figure 1 Examples of traditional Sivas houses (Source: Author Archive)

The development of Sivas houses started in the 19th century, and they were generally built on a basement as a single or duplex building. Through the overhangs on their facades, the upper floor spaces are enlarged, and enough sunlight can be taken into the volumes. Since the living spaces are on the upper floors, the rooms have been expanded and bright spaces have been obtained through the cantilevers (Şimşek, 2021; Bilget, 1992). Traditional Sivas houses are buildings that are designed according to the functionality of the spaces.

5. Method

The structure in which the study was conducted is located in Sivas province at 39° 75° North latitudes and 37° 01° East meridians (URL-1). There is no natural or artificial obstacle that will affect

the daylight illuminance level around the building. Simulation calculations were made by assuming that there are no sunshades and shading elements in the windows. According to the reference study, the earth reflectance coefficients for Sivas province were determined as minimum 1990 lx and maximum 7000 lx (Sayın, 2014). According to these determined values, the availability of the illuminance levels determined in the spaces in the volumes is given in Table 1-8 at the rate of %. The selection of the sky model to be considered in the simulation calculations in accordance with the local characteristics of the region where the examined structure is located is very important in terms of the accuracy of the numerical data to be obtained from the program. At this point, considering the meteorological data of Turkey, the average sky conditions for Sivas Province have been accepted. In the study, simulation calculations were made according to 09:00, 12:00 and 15:00 hours for 21 March, 21 June, 21 September and 21 December at certain location and average sky conditions. The ground height to be calculated in the simulation was taken to be approximately h: 0.85 m, as specified in the EN 17037 Standard (EN 17037:2018). The simulation results obtained were evaluated according to the reference EN 17037 standard. According to the standard, evaluation steps have been created for the need for light level in the volume as low, medium and high. In the standard, the minimum illuminance levels targeted for spaces with vertical openings are classified as 100 lx ≤, 300 lx ≤, 500 lx ≤ and these lighting levels are required to be provided in 95% of the space (EN 17037:2018). The simulation results of the obtained Traditional house have been evaluated according to the conditions of the reference standard, whether it is provided for certain days and time zones of the year.

There are many simulation programs used today for the design of lighting projects, observing the parameters that affect the result, and reviewing the effects of the lighting systems before the design. These; *Dialux, Relux, Velux Visualizer, Europic, Agi32, Calculux, Siteco* etc. (Yılmaz, 2007). Velux Daylight Visualizer is a professional computer program created for the analysis of daylight conditions in buildings (Velux Daylight Visualizer 3.0.22 Beta). Modeling of three-dimensional spaces designed with the program, the design of window openings with the help of catalogs and a visual analysis of the effect of daylight on the space are presented (Kazanasmaz, 2009). In this study, the evaluation of the mansion spaces in terms of lighting was made with the Velux Daylight Visualizer 3.0.22 Beta program.

5.1. Field study- traditional Hubiyar Korucu Mansion

Considering the studies in the literature, studies examining natural lighting in traditional Turkish houses are quite limited. In this context, the study has a remarkable and original feature. With this study, it is expected to contribute to the traditional Turkish house works as an addition. Sivas traditional mansions are also unexamined at this point. The natural lighting performance of the selected Hubiyar Korucu Mansion was examined in this study. In this study, it was determined whether the mansion spaces have the appropriate illuminance level according to the reference standard.

In this part of the study, there is information about the Hubiyar Korucu Mansion located on Höllüklük Street in Sivas Province. The floor plans, site plan and views obtained by the Agency of the mansion are shown in Figures 4 and 5. Although the building is not far from Sivas city center, it is located on Höllüklük Street, where the traditional texture is tried to be preserved (Figure 2).

Figure 2 Location of Hubiyar Korucu Mansion and its relationship with other registered mansions (Source: The Author)

The historical building in ruins was purchased by the Oran Development Agency in 2010 and its restoration was completed in 2014. The agency has revived the registered structure, which is one of the historical symbols of Sivas. Many studies and planning such as investment, support, training, and promotional activities in the city are now continuing in the historical Hubiyar Korucu Mansion (Figure 3) (ORAN Development Agency Activity Report, 2016).

Figure 3 The south and north facades of the mansion after restoration (Source: Author Archive)

The building has 3 floors: basement, ground floor and first floor (Figure 4). There is an adobe walled garden near the entrance to the south of the building. There are double-winged wooden garden gates opening to the street in the east and north of the garden. The basement of the building is filled with stone, and the upper floors are filled with mud brick between the timber frame (URL-2). The site floor plan of the building was examined, and no natural or artificial obstacles were found outside the building that would affect the daylight illuminance level (Figure 4).

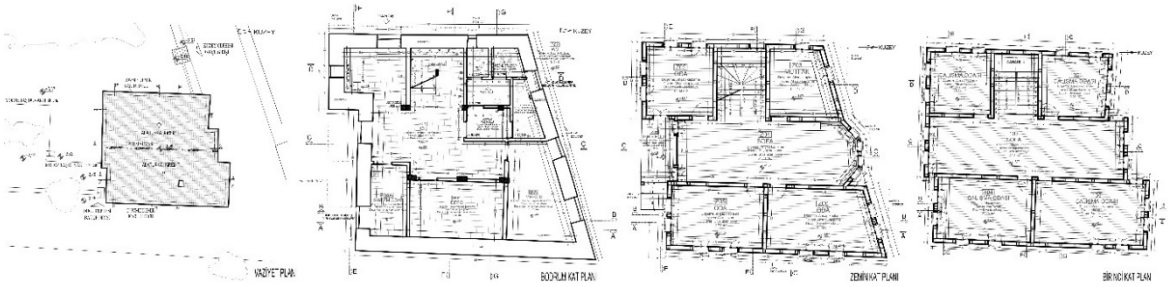

Figure 4 Floor plans of the mansion (Source: ORAN Development Agency, Photo archive)

The ground floor entrance door is reached by stairs from the garden courtyard. After the entrance door, the sofa with an area of approximately 30 m² is encountered first. There are 4 rooms numbered Z02, Z03, Z05, Z06, which can be reached from the sofa numbered Z04. Space Z03 on the floor is used as a kitchen. The wooden bench in the north of the sofa is used as a raised and sitting area. This elevated area allows for visual contact with the outdoors through the windows. When the old functions of the ground floor are examined, there are living areas, kitchen and divan room. Its current function is in the form of study rooms, kitchen and waiting area. There are windows in every room of this mansion, which is an interior sofa type. The average floor heights of the spaces are 3.54 m. When the ground floor facades are examined, there are 7 windows located at different angles in the north and south, and 4 windows in the east and west (Figure 5). All floors of the building are accessed by wooden stairs. From the ground floor to the basement floor is accessed with the help of wooden stairs. There are B01, B02, B03 and wet areas on the basement floor. Although there are small skylights in the basement floors, daylight cannot illuminate the volumes. The basement floor was used as a cellar, service, and storage area in its original function, but today it has been renovated as wet volume and storage areas. There are 3 small windows on the north side of the basement floor and 2 small windows on the south side. There are no windows on the east facade of this floor. There is a small window on the west side and a door opening to the garden. The basement floor was excluded from the study. The first floor is accessed by a wooden staircase from the ground floor and a larger sofa is encountered compared to the ground floor. Along with the projections on the facades, there was a volumetric expansion in the sofas and rooms. On the first floor, there are 4 rooms numbered 101, 102, 104, 105 opening to the sofa numbered 103. The original function of the ground floor is bedrooms-living areas. Its functions today are in the form of study and meeting rooms. When the floor plans of the building are examined, all window sizes are the same. The ground and first floor Windows are 0.90 m wide and 1.55 m high. The sofa windows on the north facade of the ground floor are 0.70 m wide on average. There are 2 small windows in the north and south directions between the roof (Figure 5).

Figure 5 Facade views of the mansion (Source: ORAN Development Agency, Photo archive)

The building has a hipped roof and is covered with eternit material. The roofs are wooden cladding with wide eaves and under eaves profile. Door and window jambs are made of wood. In addition, it has double wings and iron fingers. Between the floors, wood should be wiped (URL-2).

5.2. Building daylight performance analysis

The visuals of the results obtained from the Velux Daylight Visualizer 3.0.22 Beta program are placed on the plan drawings of the building. The results obtained for the ground and first floor plan on March 21 at 09:00, 12:00 and 15:00 are shown in Figure 6-8; the illumination levels (Lux), daylight factor (DF) and daylight performance classification (%) of the spaces are presented in Tables 1-2.

Looking at the data on March 21 at 09:00 (Figure 6); in the south facade spaces on the ground and first floors, it is seen that the illumination level of 300 lx ≤ is present in approximately 90% of the spaces. Although the illumination level of 300 lx ≤ in the northern facades is less than the other places, it is seen that the illumination level of 100 lx ≤ is present in 95% of the relevant space and it can be said that it is sufficient according to the standard.

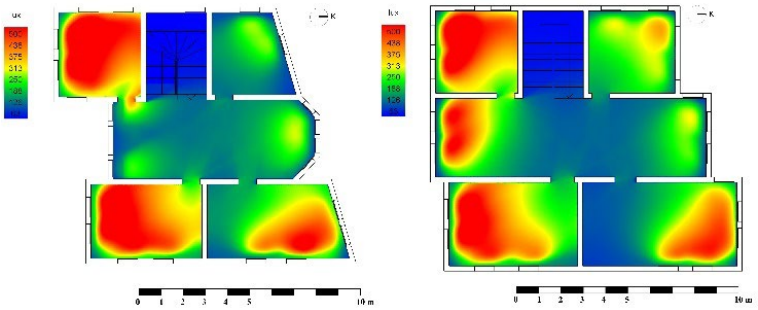

Figure 6 Lighting levels of ground and first floor plans for 21 March at 09:00

Looking at the data of March 21 at 12:00 (Figure 7); spaces Z02, Z05, 101, 104 on the ground and first floors have maximum daylight intake with illumination levels of 500 lx ≤ present in 25%-50% of the spaces. Half of some spaces and nearly all of others are adequately illuminated.

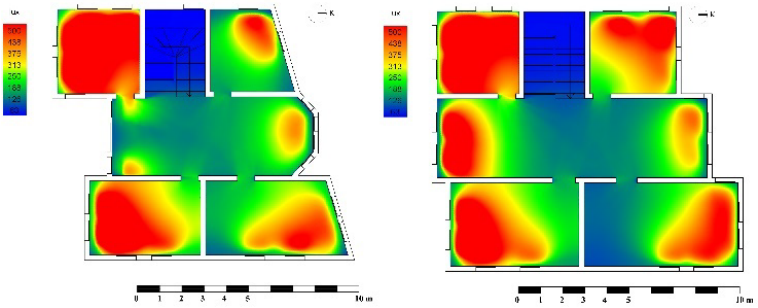

Figure 7 Lighting levels of ground and first floor plans for March 21st at 12:00

Looking at the data on March 21 at 15:00 (Figure 8); in the late afternoon, natural light intensity tends towards the south and north spaces. These spaces are Z02 on the ground floor; on the first floor are rooms 101 and 102. In approximately 40%-75% of the spaces, a lighting level of 300 lx ≤ is provided. In other facades, the illumination level of 100 lx ≤ is available in an average of 95% of the spaces.

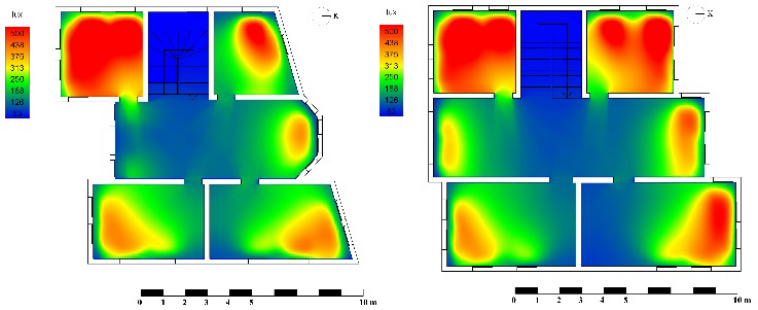

Figure 8 Lighting levels of ground and first floor plans for March 21 at 15:00

The results obtained for the ground and first floor plan on June 21 at 09:00, 12:00 and 15:00 are shown in Figures 9-11; the illumination levels (Lux), daylight factor (DF) and daylight performance classification (%) of the spaces are presented in Tables 3-4. Looking at the data on June 21 at 09:00 (Figure 9); the lighting levels of the rooms on the south and east facades are above 500 lx ≤. Approximately 50% of the spaces are illuminated with an illumination level of 300 lx ≤. Lighting levels of 100 lx ≤ are provided in 100% of the rooms.

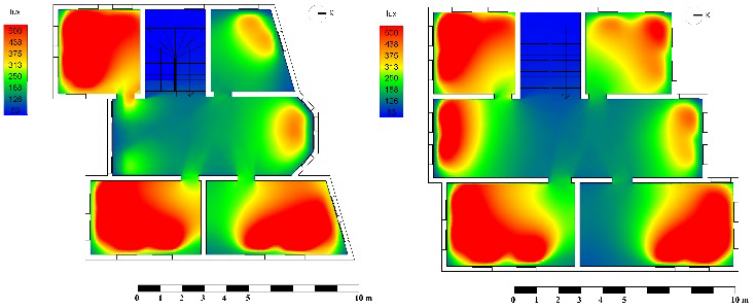

Figure 9 Lighting levels of ground and first floor plans for 21 June at 09:00

Looking at the data on June 21 at 12:00 (Figure 10); all spaces on the ground floor receive sufficient daylight according to the standard. 23%-77% of Z01, Z05 spaces have illumination levels above 500 lx ≤. According to the results of the first floor, 500 lx ≤ lighting levels are sufficient according to the standard in 8%-83% of spaces 101, 102, 104 and 105 on the south and north facades. Looking at the other rooms on the floors, approximately 58-90% of the spaces are at 300 lx ≤ lighting levels.

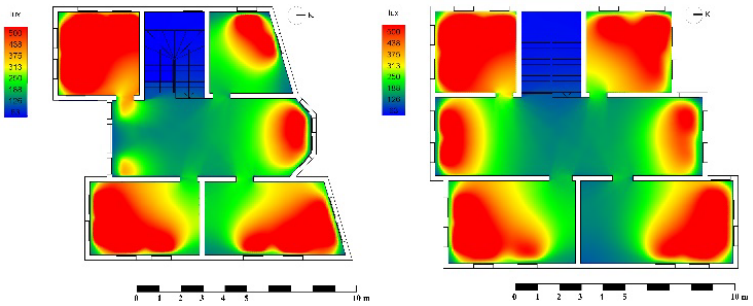

Figure 10 Lighting levels of ground and first floor plans for 21 June at 12:00

Looking at the data on June 21 at 15:00 (Figure 11); although the natural lighting decreases in the afternoon, it continues to be effective. The illumination levels of 500 lx ≤ in rooms Z02, 101, 102 on the ground and first floors are more than 50% of the spaces. In the eastern facade spaces, this illumination is effective at 300 lx ≤ levels and in 30-60% of the space.

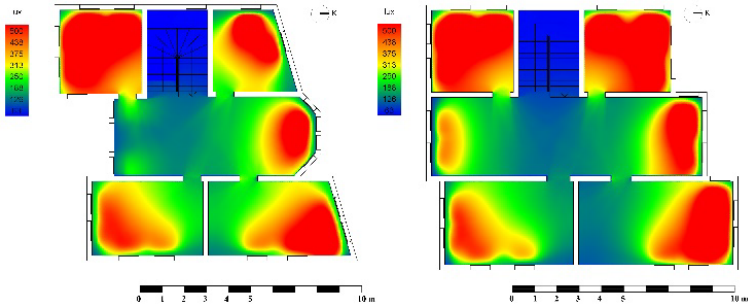

Figure 11 Lighting levels of ground and first floor plans for 21 June at 15:00

The results obtained for the ground and first floor plan on September 21 at 09:00, 12:00 and 15:00 are shown in Figures 12-14; the illumination levels (Lux), daylight factor (DF) and daylight performance classification (%) of the spaces are presented in Tables 5-6. Looking at the data on September 21 at 09:00 (Figure 12); with the sunrise, the intensity of natural light is effective in the south and east places. These spaces are Z02, Z05 and Z06 on the ground floor; on the first floor are rooms 101, 104 and 105. Lighting levels ≤ 500 lx in these rooms are available in approximately 8%-40% of the spaces. On the other hand, the daylight level of 300 lx ≤ in the spaces on the other floors varies between 0% and 94% of the spaces.

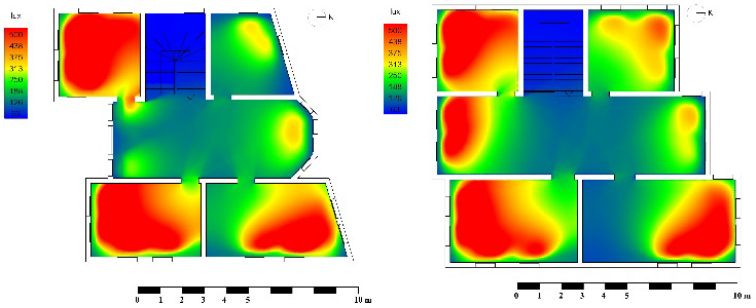

Figure 12 Lighting levels of ground and first floor plans for September 21 at 09:00

Looking at the data of September 21 at 12:00 (Figure 13); more than half of the spaces have above-average illumination. Illumination levels ≤ 500 lx vary between 11% and 73% in spaces Z02, Z05, 101,102, 103 and 104. In 70%-96% of the spaces, there are lighting levels of 300 lx ≤. In other rooms, illumination levels of 100 lx ≤ are provided in 95% of the spaces on average. This level is sufficient for daytime use according to the referenced standard.

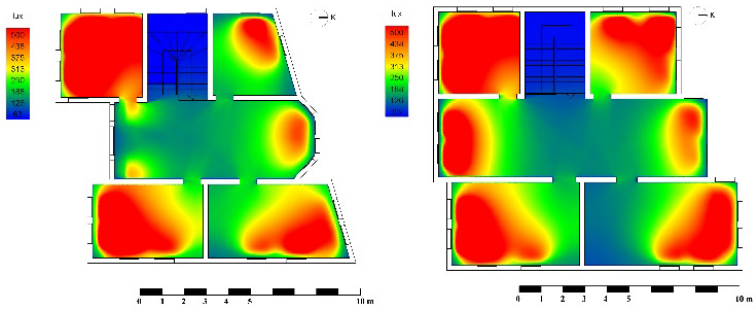

Figure 13 Lighting levels of ground and first floor plans for September 21 at 12:00

Looking at the data on September 21 at 15:00 (Figure 14); in the afternoon, natural light activity decreases in the south and east facades. Rooms Z02, 101, 102 on the ground and first floors receive more natural light compared to rooms on other facades. Lighting levels of 500 lx ≤ vary between 8% and 40% of the rooms. At the same time, the illumination level of 300 lx ≤ is available between 88% and 96% of the spaces. The lighting levels of 300 lx ≤, which are effective between 0% and 92% in other places, were not sufficient according to the standard.

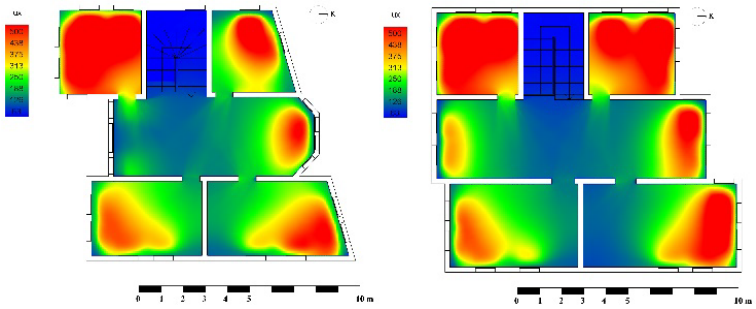

Figure 14 Lighting levels of ground and first floor plans for September 21 at 15:00

The results obtained for the ground and first floor plan on 21 December at 09:00, 12:00 and 15:00 are in Figures 15-17; the illumination levels (Lux), daylight factor (DF) and daylight performance classification (%) of the spaces are presented in Table 7-8. Looking at the data on December 21 at 09:00 (Figure 15); with the decrease in solar activity, the lighting performance of the spaces is also affected. Lighting levels ≤ 300 lx are not measured in many rooms and are insufficient compared to the reference standard. According to the standard, 100 lx ≤ illumination level of the rooms on the south and east facades is provided in 100% of the spaces.

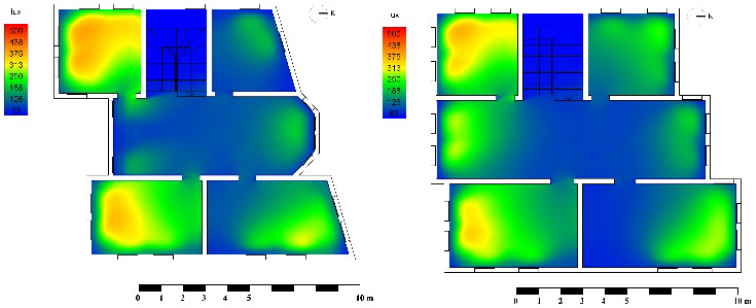

Figure 15 Lighting levels of ground and first floor plans for 21 December at 09:00

Looking at the results of the ground floor at 12:00 on December 21 (Figure 16); the lighting levels of the places on the south facades are the highest compared to other times of the day. Lighting levels of 500 lx ≤ are calculated only in rooms Z02 and 101 and this rate is 20%. Looking at the results of the ground and first floor spaces, the illumination level of 300 lx ≤ varies between 0% and 91%. Again, 100 lx ≤ lighting levels are provided at an average of 95% in all spaces. Average daylight performance is exhibited according to the reference standard throughout the spaces.

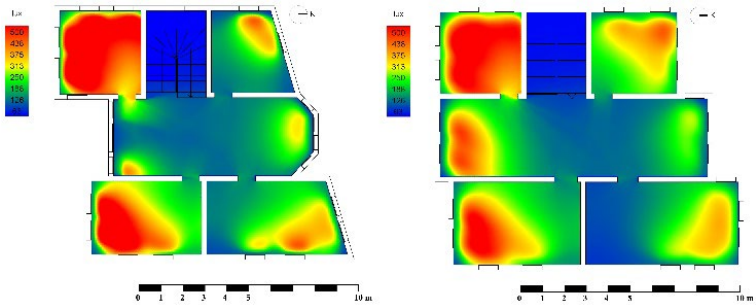

Figure 16 Lighting levels of ground and first floor plans for December 21st at 12:00

Looking at the data on December 21 at 15:00 (Figure 17); the intensity of natural light decreases in all spaces with the decrease of solar activity in the afternoon and the seasonal situation. Daylight has reduced its intensity in the spaces on the south and east facades and most of the spaces have lighting levels ≤ 300 lx. Lighting levels of 100 lx ≤ were achieved at an average of 85% in all spaces. However, it was insufficient according to the reference standard.

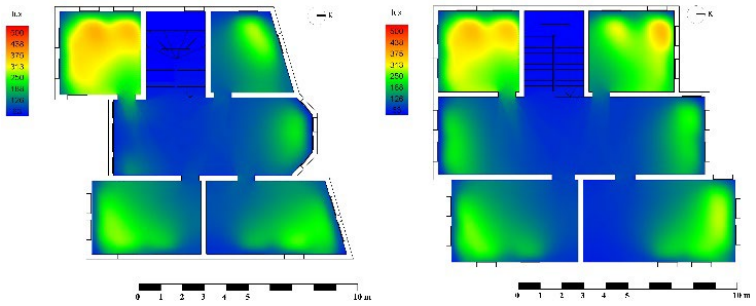

Figure 17 Lighting levels of ground and first floor plans for December 21st at 15:00

6. Building daylight performance evaluation

Necessary simulation measurements for all spaces on the ground and first floor of the mansion were determined with the Velux Daylight Visualizer program at approximate values. By using the program, the minimum, maximum and average values of the illumination level (lx) were found in each place, according to the specified dates and times. The percentages (%) of achieving the "targeted illuminance level for vertical openings" in the spaces, in accordance with the EN 17037 standard, were calculated. Percentage results were calculated according to three different illumination levels, (100 lx ≤), (300 lx ≤) and (500 lx ≤). The values on the ground and first floors for

the specified dates of 21 March, 21 June, 21 September and 21 December are calculated and presented in tables.

When the ground floor spaces for March 21 are examined (Table 1), rooms Z02 and Z05, which are the southern spaces, showed a high level of daylight performance throughout the day compared to the average lighting level values. The illumination level of 300 lx ≤ in these places during the day was observed in 96% of the rooms. The illumination level of 500 lx ≤ in the same places at 12:00 reaches up to 54% of the rooms. Lighting efficiency changes according to the hours of the day in rooms Z03, Z04 and Z06 on the northern facades. While the daylight efficiency of 100 lx ≤ dominates 95% of the spaces, the lighting level of 300 lx ≤ did not occur for every hour of the spaces. At the same time, the overhangs built on the upper floor affected the lighting levels on the lower floor compared to those on the upper floor. On the other hand, the lighting levels and percentage values of the southern facade spaces are higher than the other facade spaces.

Table 1 Daylight performances of the ground floor spaces for March 21st

		The Illumination Level (Lx)						Daylight Factor (DF)			Daylight Performance Classification (%)		
	Hour	Mean		Min		Max		Mean DF	Min DF	Max DF	100 lx ≤	300 lx ≤	500 lx ≤
Z02	9:00	392.2	lx	224.2	lx	521.6	lx	8.72%	11.27%	7.45%	100%	79%	8%
	12:00	549.3	lx	319.2	lx	756.9	lx	12.21%	16.04%	10.81%	100%	67%	54%
	15:00	371.7	lx	225.1	lx	509.1	lx	8.26%	11.31%	7.27%	100%	69%	5%
Z03	9:00	103.5	lx	65.7	lx	154.2	lx	2.30%	3.30%	2.20%	50%	0%	0%
	12:00	219.3	lx	101	lx	296.1	lx	4.87%	5.08%	4.23%	100%	0%	0%
	15:00	226	lx	89.2	lx	326	lx	5.02%	4.48%	4.66%	98%	5%	0%
Z04	9:00	93.8	lx	62.3	lx	125.9	lx	2.08%	3.13%	1.80%	35%	0%	0%
	12:00	122.6	lx	83.7	lx	173.4	lx	2.72%	4.21%	2.48%	81%	0%	0%
	15:00	184.9	lx	136.6	lx	216.8	lx	4.11%	6.86%	3.10%	100%	0%	0%
Z05	9:00	400.4	lx	263.7	lx	485.6	lx	8.90%	13.25%	6.94%	100%	90%	0%
	12:00	438.7	lx	310.8	lx	623.5	lx	9.75%	15.62%	8.91%	100%	96%	25%
	15:00	223.8	lx	179.4	lx	276.5	lx	4.97%	9.02%	3.95%	100%	0%	0%
Z06	9:00	253.7	lx	168.8	lx	356.1	lx	5.64%	8.48%	5.09%	100%	21%	0%
	12:00	264.4	lx	162.8	lx	367	lx	5.88%	8.18%	5.24%	100%	29%	0%
	15:00	209.9	lx	123.3	lx	278.2	lx	4.66%	6.20%	3.97%	100%	0%	0%

When looking at the first-floor spaces for 21 March (Table 2), an increase in the lighting values of 300 lx ≤ and 500 lx ≤ is observed compared to the ground floor. In addition to south-facing spaces, there has been an increase in the average daylight level in spaces on north facades. At 12:00, lighting levels of 300 lx ≤ were observed in all rooms of the first floor. A lighting value of 100 lx ≤ is provided in almost all of the spaces. Except for the values measured at 15:00 in rooms 103 and 104, there are 300 lx ≤ lighting levels varying between 21% and 96%. On the other hand, for rooms 101, 102 and 104 facing south at certain times, the level of 500 lx ≤ is sufficient according to the standard. With the sunrise at 09:00, an average of 300 lx ≤ values are seen in the eastern and southern facades, while an average of minimum 200 lx lighting is provided on the northern and western facades. With the change of the angle of the sun at 15:00, the average values and the lighting percentages in the spaces vary according to different facades. In rooms 101, 102, 104 and 105, sufficient daylight levels required for living spaces are observed at 15:00.

Table 2 Daylight performances of the first-floor spaces for March 21st

		The Illumination Level (Lx)						Daylight Factor (DF)			Daylight Performance Classification (%)		
	Hour	Mean		Min		Max		Mean DF	Min DF	MaxDF	100 lx ≤	300 lx ≤	500 lx ≤
101	9:00	369.4	lx	224	lx	449.9	lx	8.21%	11.26%	6.43%	100%	85%	0%

	12:00	545.8	lx	319	lx	706.9	lx	12.13%	16.03%	10.10%	100%	96%	58%
	15:00	367.3	lx	195.4	lx	489.5	lx	8.16%	9.82%	6.99%	100%	73%	0%
102	9:00	197.9	lx	144.3	lx	229.9	lx	4.40%	7.25%	3.28%	100%	73%	0%
	12:00	363.3	lx	229.7	lx	426.6	lx	8.07%	11.54%	6.09%	100%	90%	0%
	15:00	346.8	lx	195.9	lx	416.9	lx	7.71%	9.84%	5.96%	100%	75%	8%
103	9:00	231.6	lx	93.1	lx	324.4	lx	5.15%	4.68%	4.63%	98%	21%	0%
	12:00	321	lx	118.9	lx	491.5	lx	7.13%	5.97%	7.02%	100%	58%	0%
	15:00	187.9	lx	79	lx	266.2	lx	4.18%	3.97%	3.80%	94%	0%	0%
104	9:00	353.5	lx	256.3	lx	438.8	lx	7.86%	12.88%	6.27%	100%	77%	0%
	12:00	368.6	lx	247.4	lx	607.4	lx	8.19%	12.43%	8.68%	100%	75%	13%
	15:00	189.6	lx	142.9	lx	258.1	lx	4.21%	7.18%	3.69%	100%	0%	0%
105	9:00	269.4	lx	172.7	lx	355.3	lx	5.99%	8.68%	5.08%	100%	31%	0%
	12:00	314.9	lx	233.6	lx	398.4	lx	7.00%	11.74%	5.69%	100%	54%	0%
	15:00	288.2	lx	183	lx	356.9	lx	6.40%	9.20%	5.10%	100%	40%	0%

When the ground floor spaces for 21 June are analyzed (Table 3), the highest values have emerged throughout the year. The illumination levels in rooms Z02, Z05 on the south facade and Z06 on the north facade were at the maximum level for each hour determined. Average minimum levels of 400 lx are the highest measured during the year. For other places, there is an increase in the limit values of 300 lx ≤ and 500 lx ≤ according to the specified hours. In all areas of the ground floor, the lighting level at 12:00 is on average 300 lx ≤. In this hour, 300 lx ≤ illumination level is provided at a rate of 16% to 98% of all spaces. Illumination level ≤ 100 lx is available in most rooms. 500 lx ≤ illumination level only for rooms Z02, Z05 and Z06. A maximum of 83% lighting is provided in these rooms. At 09:00, while 300 lx ≤ illumination values are observed in approximately 95% of the spaces in the east and south facades, these percentages vary between 20% and 45% in the other facades. At 15:00, the activity of the sun decreases. As of this hour, the average value measured in all spaces and the percentage of the rooms illuminated vary according to the facades, and the average lighting values are minimum 295 lx and maximum 550 lx.

Table 3 Daylight performances of the ground floor spaces for June 21

		The Illumination Level (Lx)						**Daylight Factor (DF)**			**Daylight Performance Classification (%)**		
	Hour	**Mean**		**Min**		**Max**		**Mean DF**	**Min DF**	**Max DF**	**100 lx ≤**	**300 lx ≤**	**500 lx ≤**
Z02	9:00	522.2	lx	309.5	lx	635.7	lx	11.60%	15.55%	9.08%	100%	96%	60%
	12:00	586	lx	135	lx	756	lx	13.02%	6.78%	10.80%	100%	98%	77%
	15:00	558.4	lx	314.8	lx	731.6	lx	12.41%	15.82%	10.45%	100%	96%	63%
Z03	9:00	143.9	lx	93.4	lx	221.4	lx	3.20%	4.69%	3.16%	94%	0%	0%
	12:00	296	lx	105	lx	404	lx	6.58%	5.28%	5.77%	100%	19%	0%
	15:00	295.6	lx	128.4	lx	461.8	lx	6.57%	6.45%	6.60%	100%	48%	0%
Z04	9:00	109.5	lx	74.1	lx	136.8	lx	2.43%	3.72%	1.95%	73%	0%	0%
	12:00	234	lx	118	lx	351	lx	5.20%	5.93%	5.01%	96%	16%	0%
	15:00	355.8	lx	208.8	lx	452.9	lx	7.91%	10.49%	6.47%	100%	88%	0%
Z05	9:00	571.4	lx	414.1	lx	662.9	lx	12.70%	20.81%	9.47%	100%	96%	83%
	12:00	477	lx	147	lx	626	lx	10.60%	7.39%	8.94%	100%	94%	56%
	15:00	297.3	lx	241.9	lx	365.9	lx	6.61%	12.16%	5.23%	100%	44%	0%
Z06	9:00	420.6	lx	239.2	lx	648.4	lx	9.35%	12.02%	9.26%	100%	75%	23%
	12:00	398	lx	91	lx	527	lx	8.84%	4.57%	7.53%	100%	86%	23%
	15:00	365.2	lx	193.3	lx	507.8	lx	8.12%	9.71%	7.25%	100%	71%	5%

When the first-floor spaces for the date of 21 June (Table 4), the highest values are emerged throughout the year as well. At 12:00, rooms 101, 102 and 104 provided an average of minimum

450 lx illuminance level. 500 lx ≤ illumination levels are provided for the rooms of 101, 102, 104 and 105 at 8% to 83% of their spaces. However, the percentage of illumination in the rooms varies depending on the time of day and the facades. Room 103 on this floor cannot reach an illuminance level of 500 lx ≤. Illumination percentages at 300 lx ≤ in rooms range from 12% to 100%. In all spaces, the illumination level of 300 lx ≤ maximum at 12:00. Again, illumination values of 100 lx ≤ dominate in all hours examined in all rooms. At 09:00 and 15:00, average minimum 290 lx and maximum 540 lx values were measured in all spaces of the first floor. In general, all floor spaces perform above the average according to the standard in the hours examined.

Table 4 Daylight performances of the first-floor spaces for June 21

		The Illumination Level (Lx)						Daylight Factor (DF)			Daylight Performance Classification (%)		
	Hour	Mean		Min		Max		Mean DF	Min DF	Max DF	100 lx ≤	300 lx ≤	500 lx ≤
101	9:00	463.9	lx	309.9	lx	562.9	lx	10.31%	15.57%	8.04%	100%	96%	27%
	12:00	588	lx	165	lx	726	lx	13.07%	8.29%	10.37%	100%	100%	83%
	15:00	541.7	lx	258.4	lx	695	lx	12.04%	12.98%	9.93%	100%	92%	61%
102	9:00	283.6	lx	213.6	lx	328	lx	6.30%	10.73%	4.69%	100%	35%	0%
	12:00	448	lx	120	lx	527	lx	9.96%	6.03%	7.53%	100%	100%	35%
	15:00	543.7	lx	300.8	lx	705.4	lx	12.08%	15.12%	10.08%	100%	96%	66%
103	9:00	291.1	lx	119.6	lx	416.9	lx	6.47%	6.01%	5.96%	100%	52%	0%
	12:00	160	lx	79	lx	447	lx	3.56%	3.97%	6.39%	91%	12%	0%
	15:00	319.9	lx	125.2	lx	499.5	lx	7.11%	6.29%	7.14%	100%	56%	0%
104	9:00	505.9	lx	365.6	lx	602.2	lx	11.24%	18.37%	8.60%	100%	96%	54%
	12:00	489	lx	106	lx	625	lx	10.87%	5.33%	8.93%	100%	93%	66%
	15:00	253.6	lx	189	lx	339.3	lx	5.64%	9.50%	4.85%	100%	13%	0%
105	9:00	486.9	lx	330.1	lx	626.7	lx	10.82%	16.59%	8.95%	100%	96%	46%
	12:00	195	lx	83	lx	576	lx	4.33%	4.17%	8.23%	100%	13%	8%
	15:00	466.4	lx	243.8	lx	638	lx	10.36%	12.25%	9.11%	100%	92%	46%

When the measured lighting levels on the ground floor rooms as of September 21 are examined (Table 5), the presence of the sun's activity in most of the spaces is argued. Average minimum 260 lx and maximum 610 lx values were calculated for all hours in places Z02 and Z05 facing south. The intensity of 500 lx ≤ illumination level in these spaces varies between 8% and 69% depending on the hours. In the same rooms, the intensity of 300 lx ≤ illumination level in the rooms reaches approximately 90%-95%. The illumination levels of rooms Z02, Z03, Z04 and Z06 on the north and west facades are minimum 120 lx and maximum 330 lx. Maximum 300 lx ≤ illumination level provides illumination in the space up to 96%. While the illumination levels of 100 lx ≤ 100 lx in the rooms are between 95% and 100% in general, this percentage decreases at different times in some places and remains insufficient compared to the standard. At 09:00 and 15:00 hours, the illumination levels and illumination percentages of the rooms change and decrease depending on the direction of sunlight.

Table 5 Daylight performances of the ground floor spaces for September 21st

		The Illumination Level (Lx)						Daylight Factor (DF)			Daylight Performance Classification (%)		
	Hour	Mean		Min		Max		Mean DF	Min DF	Max DF	100 lx ≤	300 lx ≤	500 lx ≤
Z02	9:00	479.8	lx	269.8	lx	623.1	lx	10.66%	13.56%	8.90%	100%	94%	40%
	12:00	617.3	lx	367	lx	814.7	lx	13.72%	18.44%	11.64%	100%	96%	69%
	15:00	467.5	lx	269.4	lx	651.4	lx	10.39%	13.54%	9.31%	100%	92%	33%
Z03	9:00	122.3	lx	79.7	lx	184.1	lx	2.72%	4.01%	2.63%	71%	0%	0%
	12:00	206.8	lx	112.1	lx	338.1	lx	4.60%	5.63%	4.83%	100%	6%	0%

	15:00	268.1	lx	108.1	lx	424.3	lx	5.96%	5.43%	6.06%	100%	31%	0%
Z04	9:00	104.9	lx	69.8	lx	136.3	lx	2.33%	3.51%	1.95%	67%	0%	0%
	12:00	127.3	lx	86.6	lx	173.1	lx	2.83%	4.35%	2.47%	85%	0%	0%
	15:00	252.5	lx	181.8	lx	298.9	lx	5.61%	9.14%	4.27%	100%	0%	0%
Z05	9:00	505.6	lx	334.9	lx	597.8	lx	11.24%	16.83%	8.54%	100%	13%	8%
	12:00	484.5	lx	358.6	lx	659.6	lx	10.77%	18.02%	9.42%	100%	94%	56%
	15:00	261.5	lx	209.6	lx	322.2	lx	5.81%	10.53%	4.60%	100%	13%	8%
Z06	9:00	332.9	lx	206.5	lx	475.9	lx	7.40%	10.38%	6.80%	100%	60%	0%
	12:00	310.9	lx	186.8	lx	434.8	lx	6.91%	9.39%	6.21%	100%	52%	0%
	15:00	271.1	lx	155.4	lx	364.2	lx	6.02%	7.81%	5.20%	100%	38%	0%

When the first-floor rooms are examined for the date of September 21 (Table 6), the natural lighting reaching to the rooms on this floor is higher compared to the ground floor. Looking at the rooms 102 and 103, daylight performance is significantly increased even at the same hours compared to rooms on the ground floor. This is due to the existence of overhangs builted on the upper floor. On the other hand, the lighting level on the ground floor is sufficient for the functionality of these spaces. In rooms 101, 102, 103 and 104 on this floor, the illumination level of 500 lx ≤ vary as of 11% to 73% of the rooms and varies according to the determined hours. These levels were not found in other places. While the illumination values of 300 lx ≤ in most of the rooms reach a maximum at 12:00, this situation changes depending on the facade orientation of the spaces at 09:00 and 15:00. In rooms 101, 102, 104 and 105 and at different hours, the average lighting values of 220 lx and maximum 600 lx were measured. In general, at 12:00, there is daylight activity at the level of 300 lx ≤ between 71% and 96%. Lighting values of 100 lx ≤ 100% are available in all spaces.

Table 6 Daylight performances of the first-floor spaces for September 21st

		The Illumination Level (Lx)						Daylight Factor (DF)			Daylight Performance Classification (%)		
	Hour	Mean		Min		Max		Mean DF	Min DF	Max DF	100 lx ≤	300 lx ≤	500 lx ≤
101	9:00	442.3	lx	268.4	lx	549	lx	9.83%	13.49%	7.84%	100%	93%	21%
	12:00	607.4	lx	356.1	lx	777	lx	13.50%	17.89%	11.10%	100%	96%	73%
	15:00	460.5	lx	229.7	lx	611	lx	10.23%	11.54%	8.73%	100%	88%	40%
102	9:00	237.1	lx	175.7	lx	283	lx	5.27%	8.83%	4.04%	100%	0%	0%
	12:00	410.9	lx	263.6	lx	477.5	lx	9.13%	13.25%	6.82%	100%	92%	0%
	15:00	446.1	lx	241.8	lx	561.9	lx	9.91%	12.15%	8.03%	100%	88%	23%
103	9:00	280.9	lx	110.5	lx	402.6	lx	6.24%	5.55%	5.75%	100%	50%	0%
	12:00	352.5	lx	132.3	lx	527.3	lx	7.83%	6.65%	7.53%	100%	71%	11%
	15:00	249.6	lx	100	lx	364.6	lx	5.55%	5.03%	5.21%	100%	40%	0%
104	9:00	449.5	lx	333.1	lx	547.8	lx	9.99%	16.74%	7.83%	100%	96%	19%
	12:00	410.8	lx	266.5	lx	639.7	lx	9.13%	13.39%	9.14%	100%	90%	21%
	15:00	221.5	lx	166.5	lx	300.9	lx	4.92%	8.37%	4.30%	100%	2%	0%
105	9:00	369.2	lx	257.8	lx	475	lx	8.20%	12.95%	6.79%	100%	85%	0%
	12:00	373.1	lx	235.5	lx	467.3	lx	8.29%	11.83%	6.68%	100%	85%	0%
	15:00	367.9	lx	197	lx	476	lx	8.18%	9.90%	6.80%	100%	77%	0%

Looking at the ground floor rooms for the date of 21 December (Table 7), the lowest illumination values are available throughout the year. With the decrease in the effect of sunlight and the duration of sunlight in the city together with the climate, the level of illumination in the spaces of natural light has also decreased. Maximum daylight to the spaces during the day was measured at 09:00 and 12:00 only on the south and east facades. When looking at these spaces, the lighting levels in the Z02 and Z05 rooms at the specified hours are between a minimum of 130 lx and a

maximum of 400 lx on average. The illumination level of 500 lx ≤ in the rooms was measured as 20% at 12:00 only in the Z02 room. The average availability of day lightening for 300 lx ≤ values in these rooms is 75%. In Z03, Z04 and Z06 venues, on the other hand, due to their west and north orientation, they vary between the minimum 60 lx and maximum 135 lx levels according to the hours. For this reason, 500 lx ≤ and 300 lx ≤ levels, which should be found in these places according to the standard, could not be achieved. Expanded overhangs at certain rates on the upper floors also directly affected the lighting performance.

Table 7 Daylight performances of the ground floor spaces for December 21st

		The Illumination Level (Lx)						Daylight Factor (DF)			Daylight Performance Classification (%)		
	Hour	Mean		Min		Max		Mean DF	Min DF	Max DF	100 lx ≤	300 lx ≤	500 lx ≤
Z02	9:00	210.2	lx	128	lx	276	lx	4.67%	6.43%	3.94%	100%	0%	0%
	12:00	408	lx	111	lx	517	lx	9.07%	5.58%	7.39%	100%	77%	21%
	15:00	197.6	lx	129.7	lx	258.4	lx	4.39%	6.52%	3.69%	100%	0%	0%
Z03	9:00	61.7	lx	38.4	lx	91.6	lx	1.37%	1.93%	1.31%	0%	0%	0%
	12:00	135	lx	55	lx	203	lx	3.00%	2.76%	2.90%	96%	0%	0%
	15:00	115.3	lx	49.6	lx	151.1	lx	2.56%	2.49%	2.16%	84%	0%	0%
Z04	9:00	56.8	lx	38.6	lx	75.7	lx	1.26%	1.94%	1.08%	0%	0%	0%
	12:00	131	lx	78	lx	166	lx	2.91%	3.92%	2.37%	84%	0%	0%
	15:00	91.5	lx	70.2	lx	108.4	lx	2.03%	3.53%	1.55%	23%	0%	0%
Z05	9:00	199.9	lx	137.8	lx	240.4	lx	4.44%	6.92%	3.43%	100%	0%	0%
	12:00	326	lx	71	lx	427	lx	7.24%	3.57%	6.10%	100%	73%	0%
	15:00	136.1	lx	109	lx	167	lx	3.02%	5.48%	2.39%	100%	0%	0%
Z06	9:00	128.3	lx	86.9	lx	179.2	lx	2.85%	4.37%	2.56%	81%	0%	0%
	12:00	193	lx	63	lx	251	lx	4.29%	3.17%	3.59%	100%	0%	0%
	15:00	112.6	lx	66.7	lx	153.1	lx	2.50%	3.35%	2.19%	71%	0%	0%

Looking at the first-floor spaces for 21 December (Table 8), the lowest illumination values of the year were also measured. In this floor, a slight increase in values is observed compared to the ground floor. While the 500 lx ≤ illumination level in the spaces is taken as 20% only for the room 101, the 300 lx ≤ values are observed to vary between 6% and 91% of the rooms 101, 102, 103 and 104 at different times and are valid for all places at 12:00. This performance could not be achieved for other times. Looking at the rooms on the floor, the highest sun light activity was reached at 12:00 in rooms 101 and 104 on the south side. It averages between a minimum of 110 lx and a maximum of 380 lx. It varies between a minimum of 90 lx and a maximum of 200 lx in these venues for 09:00 and 15:00. Considering the daylight performances in other rooms, 300 lx ≤ values cannot be achieved, but 100 lx ≤ illumination levels vary according to hours. The values of 100 lx ≤ in the spaces show an efficiency between 46% and 100% depending on the facades and are insufficient compared to the standard.

Table 8 Daylight performances of the first-floor spaces for December 21st

		The Illumination Level (Lx)						Daylight Factor (DF)			Daylight Performance Classification (%)		
	Hour	Mean		Min		Max		Mean DF	Min DF	Max DF	100 lx ≤	300 lx ≤	500 lx ≤
101	9:00	200.4	lx	128.2	lx	246.3	lx	4.45%	6.44%	3.52%	100%	0%	0%
	12:00	380	lx	95	lx	477	lx	8.44%	4.77%	6.81%	100%	91%	20%
	15:00	194.9	lx	114.8	lx	248.5	lx	4.33%	5.77%	3.55%	100%	0%	0%
102	9:00	117.1	lx	83.9	lx	136.8	lx	2.60%	4.22%	1.95%	88%	0%	0%
	12:00	252	lx	69	lx	287	lx	5.60%	3.47%	4.10%	100%	18%	0%
	15:00	176.8	lx	109.7	lx	213	lx	3.93%	5.51%	3.04%	100%	0%	0%

103	9:00	118.8	lx	50.4	lx	158.9	lx	2.64%	2.53%	2.27%	73%	0%	0%
	12:00	115	lx	57	lx	371	lx	2.56%	2.86%	5.30%	62%	6%	0%
	15:00	92.2	lx	41.7	lx	126.5	lx	2.05%	2.10%	1.81%	46%	0%	0%
104	9:00	172.9	lx	124.5	lx	216.6	lx	3.84%	6.26%	3.09%	100%	0%	0%
	12:00	296	lx	73	lx	383	lx	6.58%	3.67%	5.47%	100%	58%	0%
	15:00	114.7	lx	87.5	lx	154.8	lx	2.55%	4.40%	2.21%	84%	0%	0%
105	9:00	144.2	lx	103.9	lx	183.2	lx	3.20%	5.22%	2.62%	100%	0%	0%
	12:00	106	lx	40	lx	272	lx	2.36%	2.01%	3.89%	62%	0%	0%
	15:00	145.2	lx	91.8	lx	180.8	lx	3.23%	4.61%	2.58%	98%	0%	0%

7. Results

The traditional Hubiyar Korucu Mansion is one of the important examples of Sivas civil architecture. At the same time, it is an exemplary building where the correct design decisions are made in terms of natural lighting and mostly positive results are obtained according to the reference standard. The importance of correct window designs has emerged in this mansion structure, which bears the traces of traditional Turkish houses. In this study, the traditional Turkish architectural structure is analyzed with the Velux Daylight Visualizer Simulation program and evaluated according to the "EN17037 Standard". Considering the annual analyzes, the visual comfort criteria related to daylight are mostly met in every space, except for some days and hours.

In the first evaluation, average daylight is dominant in all spaces of the ground and first floor. The daylight level of the spaces on the south facades is higher than on the north facades. This value on 21 June is the highest compared to other dates. On December 21, the lighting level of the places is the lowest compared to other dates. According to the EN 17037 standard, the lighting level of the places are insufficient and below the limit on December 21. South facade spaces mostly provided an average of 300 lx lighting levels and have high performance compared to the reference standard. The daylight level on the northern facades is insufficient compared to the standard value of some dates. Daylight illumination values in all places are at the highest level at 12:00. At 09:00 and 15:00, these values decrease. Lighting level of 100 lx ≤ in all rooms of the building is provided in approximately 95% of the spaces. For 21 December, the illumination levels of 500 lx ≤ and 300 lx ≤ do not dominate the spaces due to climatic conditions. In this case, the appearance of this illumination level in 95% of the space is insufficient compared to the reference standard. Illumination level ≤ 300 lx is available in more than half of the rooms in the south-facing rooms and on 21st June in the north-facing rooms. On the other hand, 500 lx ≤ illumination level is provided at an average of 50% on 21 June in the south facades. The minimum, maximum and average percentage values of the daylight factor are calculated according to the illumination levels obtained from the simulation. According to the reference EN 17037 standard, although the necessary visual comfort conditions for the mansion spaces cannot be provided in some days and hours, mostly natural light is at average levels in every space. At the same time, the ceiling height of the spaces, the number of windows in the rooms and their dimensions directly affect the natural lighting levels of the mansion spaces. Large windows designed even in the small rooms of the building provide high levels of illumination to the spaces. The absence of a shading element such as blinds outside the window and obstacles that directly block the daylight around the building are also other factors affecting the level of illumination.

Architectural designs and parameters that increase daylight in traditional houses differs from contemporary buildings. In Table 9, the similarities and differences between the Hubiyar Korucu Traditional Mansion and the Sivas Cumhuriyet University Residences according to architectural parameters are discussed (Table 9). The measurements in the table are evaluated in the smallest units of the structures compared.

Table 9 Comparison of the main differences/similarities between contemporary and traditional architecture with architectural parameters

Parameters / **Buildings**	Window Dimensions (width x height)	Window Above Ground	Number of Windows in the Space	Total Span in Space	Floor Height of the Space	Space Dimensions (width x length)	Spatial Depth	Extension	Structural Barriers
Hubiyar Korucu Traditional Mansion	0.9 m x 1.70 m	0.9 m	4	6.12 m2	3.54 m	3.70 m x 3.75 m	13.8 m2	0.6 m	No
Cumhuriyet University Housing	2.0 m x 1.30 m	0.8 m	1	2.6 m2	2.66 m	2.85 m x 4.0 m	11.4 m2	No	No

According to the reference rooms, there are 4 windows in the traditional residence and 1 window in the contemporary lodging structure. Depending on the width and height of the windows, the total opening in the spaces changes. Compared to contemporary one it is seen that the window sizes in the traditional house are smaller. However, the large number of windows in the traditional mansion space has increased the total window opening in the room approximately 2.5 times compared to the contemporary building. Although the spatial depth dimensions of the two compared rooms are like each other, it is likely that the total window opening difference significantly affects the daylight performance in the space. This deficiency seen in contemporary buildings can cause negative results in terms of both psychological comfort and energy saving.

By this study and the results of the analysis, it is revealed that traditional design principles can be a guide in contemporary building design process, especially in residential buildings. Because the studies that examine the natural lighting in traditional Turkish residences are limited, this study has a remarkable and original contribution to the existing Traditional Turkish House studies.

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Leveraging discrete event simulation modeling to evaluate design and process improvements of an emergency department

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Abstract

This study exemplifies the practical application of the Discrete Event Simulation (DES) approach for evaluating the effectiveness of suggested processes and design modifications in improving the existing bottlenecks of an Emergency Department. EDs are under escalating pressure to deliver efficient care while handling considerable challenges, such as overcrowding, delays, length of stay, safety risks, or staffing. Many ED appointments are non-urgent and can be treated in an alternative outpatient setting. Suitable demand-capacity matching and adjusted admission protocols reduce ED patients' Length of Stay (LOS) and improve boarding times. Alternatively, new design suggestions include applying results-pending areas where lower acuity patients wait for their pending lab or imaging results. In this study, DES assesses underlying conditions and existing bottlenecks in an existing ED. The current ED flow involved a "pull-until-full" for exam room boarding and bedside registration after triage fulfillment. Nonetheless, the ED experienced boarding delays for patients waiting to be admitted into the hospital. This study explored two scenarios in DES as potential alternatives for reducing LOS: the implication of a "rapid-admit" protocol and a "results-pending" area. Findings showed that the Rapid-Admit process reduced the admitted patient's LOS by 16%. On average, the results-pending implication reduced the admit LOS by an average of 32% across all ESI levels. These findings suggest the importance of process, staffing, and spatial modifications to achieve ED operational improvements. DES enabled a data-driven approach to evaluate bottlenecks, enhance architect-owner communication, and optimize the system for future design and process improvement alternatives.

Keywords: emergency department, discrete event simulation model, length of stay, rapid admission, results pending area, technology integration

1. Introduction

ED crowding, unpredictable arrival rates, evolution in the appeal for ED services, workload variability, and resource limitations are obstacles to improving ED flow (Srinivas et al., 2021). Across the United States, ED crowding remains the central issue in the healthcare system as it provides mainly half of the delivered medical care (Trzeciak & Rivers, 2003). In the last 20 years, Many Eds have been operating at overcapacity with an increase in demand by 50%, while Eds are continuously short-staffed, and the number of ED units has declined by 11% (American Hospital Association, 2015).

Crowded EDs reduce staff satisfaction and productivity and the increased likelihood of experiencing burnout or suicide (Schernhammer & Colditz, 2004; Wiler et al., 2011). Further, ED overcrowding diverts valuable staff resources from other patients, reduces ED capacity and patient

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mortality, and causes a loss of revenue (Boulain et al., 2020; Quinn et al., 2007; Yancer et al., 2006). At the treatment stage, resource shortages (staffing, ED rooms, imaging rooms) and delayed test results (Ultrasound, X-Ray, computed tomography (CT scan) become the bottleneck that causes ED congestion (van der Linden et al., 2017). Several studies have focused on identifying the source of ED crowding at the treatment and discharge stages (Amarasingham et al., 2010; Patel et al., 2014; Singer et al., 2011; van der Linden et al., 2017).

Growing evidence has demonstrated an association between long ED boarding times and adverse events, such as in-hospital deaths and crowding (Amarasingham et al., 2010; Boulain et al., 2020; Patel et al., 2014; Singer et al., 2011). For instance, Boulain et al. (2020) found that among 68632 ED visits, patients with boarding times more extended than four hours were more likely to experience hospital deaths. The delayed discharge process to transfer or admit patients from Eds to inpatient beds also plays a prominent role in ED waiting times. Several studies have examined different strategies to reduce undesirable ED crowding. These techniques include directing low-acuity patients to a co-located outpatient facility, public education, or increasing the working hours of primary care centers (Dolton & Pathania, 2016; Morley et al., 2018; Sharma & Inder, 2011). Other investigations have focused on expediting the patient flow within the ED system (Amarasingham et al., 2010; Bal et al., 2017; Copeland & Gray, 2015; Han et al., 2010; Valipoor et al., 2021a).

Established in 2005, the Rapid-Admission policy (RAD) enables admitting physicians to evaluate and request patient boarding before fulfilling all diagnostic tests (Amarasingham et al., 2010; Quinn et al., 2007). This intervention reduces Length of Stay (LOS), boarding times, and admission orders (Amarasingham et al., 2010; Quinn et al., 2007). Another approach for lessening ED LOS is directing low-acuity patients to an ED internal waiting area termed "Results-Pending" as they anticipate imaging or lab results (Bryant, 2013; White et al., 2014; Zilm et al., 2010). Together with other interventions, these studies show that applying the results-pending area correlated to improved efficiency and reduced LOS outcomes.

Discrete Event Simulation (DES) represents the operation of a system as a discrete order of events in time. Events happen at a specific time and exhibit a state transformation in the system (Page & Kreutzer, 2006; Zeigler et al., 2000). Simulation contributes to studying the behavior and interactions within a system to facilitate decision-making, productivity, and promptly experimenting with new potential possibilities (Mielczarek & Uziałko-Mydlikowska, 2012; Norouzzadeh et al., 2014; Srinivas et al., 2021; Swan et al., 2019). Fundamental elements of DES in healthcare include patient flows through the system, arrival rates, location resources, equipment resources, staffing resources, and service time (Cai & Jai, 2019).

Health research from 1981 onwards has applied DES to improve healthcare systems and operations by evaluating effective resource utilization (Mielczarek & Uziałko-Mydlikowska, 2012; Swan et al., 2019). Healthcare systems employ DES to acquire data on the system's current state, experiment with different control measures, and decide on the most suitable strategy (Martin et al., 2003). Applications include re-engineering patient flow for reduced waiting time or improving staff scheduling (Mielczarek & Uziałko-Mydlikowska, 2012; Swain, 2011). DES studies pursue resource allocation optimization by creating a future forecast for the quantity or adjacency of architectural spaces (Mielczarek & Uziałko-Mydlikowska, 2012; Oh et al., 2016; Shim & Kumar, 2010a).

For emergency departments, simulation models often explore patient flow staff activities, patient acuity, the actions performed, and performance measures (Oh et al., 2016; Quinn et al., 2007; Rossetti et al., 1999; Swan et al., 2019; Yancer et al., 2006). This scenario will respond to "what if" questions by altering patient flows, staffing resources, or built environment variables. For example, Oh et al. (2016) evaluated and compared system improvements in an ED, finding that reducing adult patient Computed Tomography (CT) scan oral contrast drinking time improved self-dictation use in radiology and reduced sample re-collection rates affecting LOS.

Shim & Kumar (2010) employed simulation studies to study ED overcrowding improvement to show that adding an extra payment station reduced patient waiting time by 41%. Valipoor et al. (2021) explored the likely impact of boarding the patients in the hallway rather than in exam rooms. Findings showed that LOS was significantly reduced for all patients, provided the EMS triage scenario implementation (a dedicated space for triaging EMS patients).

Based on the literature review, we understand that applying the simulation technique facilitates hospital services. Thus, the study aimed to explore the possibility of providing design or operational solutions using DES techniques. This way, the design team evaluated several optimized scenarios without needing scale tests.

2. Methodology

2.1 Data and Simulation Input

The site was purposefully selected for the simulation modeling as part of the architecture design process for designing a new ED construction in the sub-urban region of North Carolina (NC). Processing time, staffing schedule, and staff input for two existing EDs were provided as a benchmark for the new facility. The June 2021st quality assessment report for this facility suggested the following benchmarks to be improved: Left Without being seen = 1.87% (target goal: <0.5%); ED arrival to discharge=158 minutes (target goal 125 minutes) and ED orders for admission (request for bed) for ED departure = 214 minutes (Target: 150 minutes). Therefore, the client was interested in solutions for flow modifications or design alterations that improve patient waiting times and length of stay as a guideline for the new ED facility.

This cross-sectional case study focused on one of the client's suggested ED benchmarks. In addition to the ED, the facility also included an outpatient laboratory area providing care for both the ED and outpatient populations. The site was a stand-alone emergency department with 12 private treatment rooms, an X-ray, CT scan, ultrasound testing, and an ambulance receiving area. The staff had converted one of the office rooms into an exam room, resulting in 13 treatment rooms (Figure 1).

This study derived input and validation for this model from over 20,336 unique patient visits collected from July 1st, 2020, to June 30th2021. We collected no identifiable information from the patients for this evaluation. Each patient's information included over 24 variables, including arrival time, ESI level, process timestamps, last ED room, ED disposition, and ED departure.

Figure 1 The Emergency Department layout and room functions (Image Copyright: Author).

Patient-level visit data was available for ED, lab, and radiology subprocesses. Physicians' and nurses' schedules defined the staffing levels. Process timestamps comprised: 1- arrival to triage; 2- arrival to registration; 3- arrival to first bed; 4- arrival to the first provider; 5- arrival to first disposition selected; 6- arrival to first admit order; 7- arrival to first bed; 8- arrival to ready to discharge. Differences between timestamps were applied as processing times for registration, triage, lab specimen collection, radiology process, ED time with the provider, ED wait for BED, and ED bed assignment. Different proportions extracted from the data included acuity, final disposition, and lab or imaging orders. The model outputs, such as LOS, wait for provider, or time with the provider, were compared with the current ED benchmarks for validation purposes.

The DES was developed using several assumptions. Firstly, based on the staffing schedule, the provider is on-site when needed and not acquired by another patient. We also assumed that the model's movement characteristics and path of travel resemble the personnel's actual behavior pattern (using the shortest path of travel). Patient arrival schedule was calculated based on the maximum number of patients; 6- process data from July 2020 to June 30th, 2021; 7- ESI level 1 patient are the only ones using the trauma room. The model was simulated for six months, and the data collected for the first two days were eliminated for warmup.

The data excluded the following patient types: Expired, left-without-being seen (LWBS), left without notification, Behavioral health pending placement, and discharge-transfer refusal. These exclusions resulted in 19,839 data visits (AVG = 54, Min = 32, Max = 85, Mode= 52, SD = 9.6). The distribution of different ESI levels was calculated and accounted for in the simulation model (ESI 1 = 0.14%, ESI 2 = 8.21%, ESI3 = 54.51, ESI 4 = 34.25%; and ESI 5 = 2.9%). The model described the hourly arrival rate from 00:00 am to 12 am as a percentage per hour. The calculation revealed that 24.51% of patient arrivals happened between 6-9 pm, and the lowest volumes happened between 3- 6 am (5.64% of total daily volume). Patient disposition data were calculated as Admit = 6.85%, discharge = 91.24%, and transfer = 1.91% (admit and transfer patients were grouped for the model input). The model also considered the distribution of patients per ESI level for admission and discharge (Table 1).

Table 1 The distribution of patients per ESI level for admission or discharge dispositions.

ESI	Admit	Discharge
1	1.26	0
2	26.76	6.52
3	60.65	54.01
4	1.33	37.3
5	0	3.17

2.2 Patient Flow

Walk-in patients arrived at the ED through the front door and then completed the quick registration at the front desk. The front desk assigned an emergency Severity Index (ESI) based on a mixture of resources. This level ranges from 1 (most severe) to 5 (least severe). In this simulation model, we assumed all ESI 1 patients arrive in the ambulance and are transferred to the resuscitation room or any available exam rooms. EMS patients were given priority for staffing and room allocation. A nurse technician escorted the patients from the waiting room to assigned exam rooms for other patients. The ED employed the pull-until-full approach, where patients are escorted to any available exam rooms until there is no capacity.

In exam rooms, patients receive care through a nurse triage. Then the physician delivers an initial assessment and selects a disposition. The complete registration occurs inside the room while the patient waits for the imaging, lab, bed assignment, or discharge disposition administration. Imaging techs or nurses collected lab samples inside exam rooms. If needed, imaging techs escorted the patients to the designated radiology or CT rooms for imaging orders. In the current model, patients waited for lab or CT results in the exam room. The patient's length of stay (LOS) was measured from arrival to when the patient left the ED. Depending on ESI levels, physician or nurse time spent with patients was retrieved from historical data. After the model was completed, the researcher verified

the sequence of events by communicating with the nurse managers and unit director and conducting on-site observation assessments. Figure 2 displays the overview of the simulation model 3D environment.

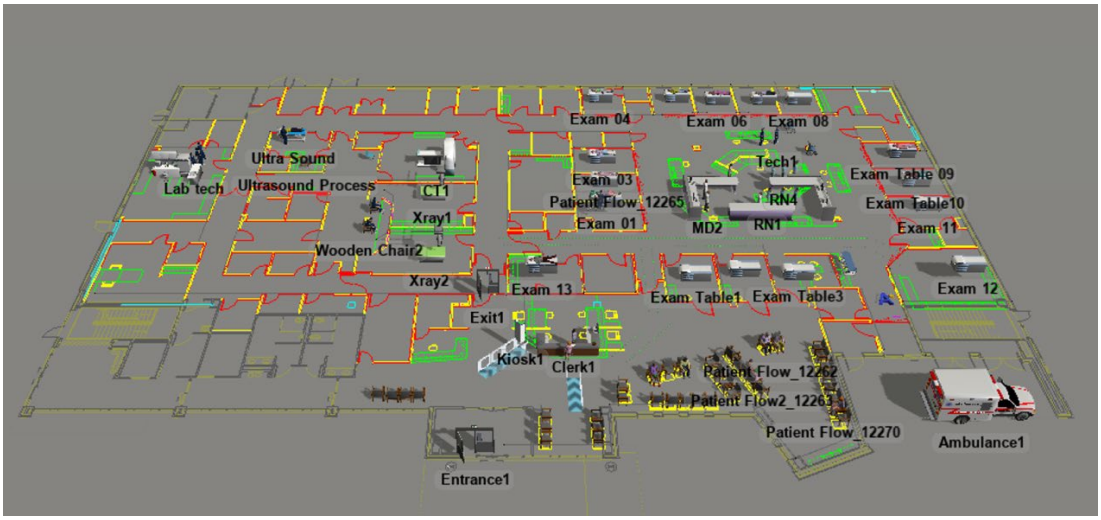

Figure 2. The 3D perspective image of the simulation modeling connects space resources with staff resources and patient flow (Image Copyright: Author).

2.3 Scenario development

The current ED performance compared to the proposed system was assessed using a DES built-in FlexSIM HC 2021. The focus was on identifying low-cost and achievable physical environment or flow strategies for improving patient flow and reducing LOS. Firstly, we explored the implementation of a rapid-admission protocol that allows the physician to request a patient bed in the inpatient unit before completing all diagnostic testing. The assumption was that this patient flow modification would decrease the LOS for admitted patients, and accordingly, with more exam rooms and clinician availability, discharge LOS would be reduced (Figure 3). We discuss the findings for these two scenarios in the following section.

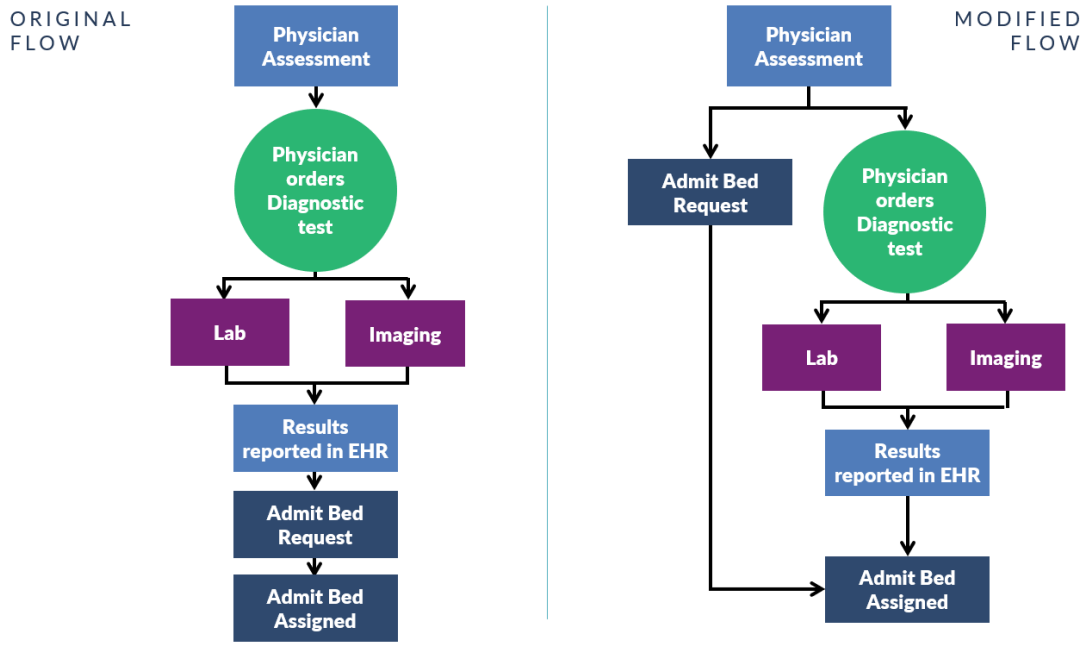

Figure 3 This diagram compares the original ED flow with the modified Rapid-Admit protocol (Image Copyright: Author).

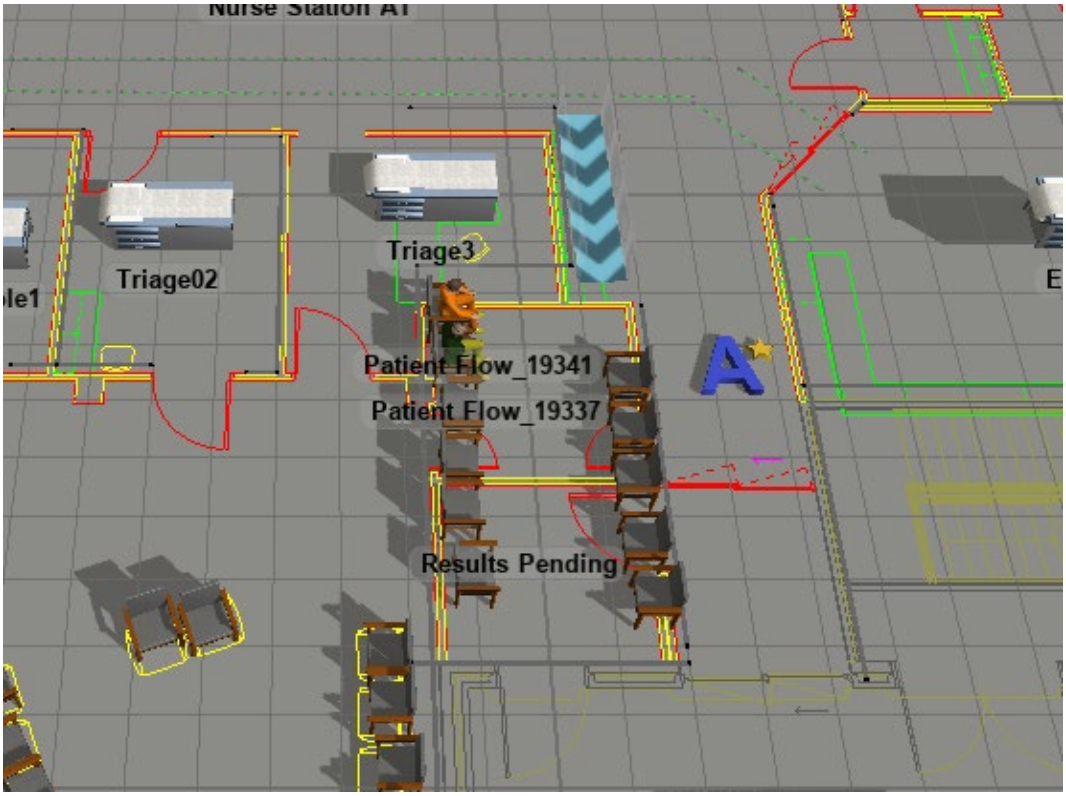

Figure 4 The Results pending area was created in the ED to evaluate its outcome on patient LOS (Image Copyright: Author).

Secondly, we examined the impact of a results-pending area as a space for less acute patients to wait for imaging or lab results instead of occupying the exam room. This space was assumed to replace an existing low-utilized office area within the ED and provided 11 seats for the patients (Figures 4-5). The hypothesis was that this would lead to a reduced LOS for admit patients due to more exam room availability and no impact on discharge LOS.

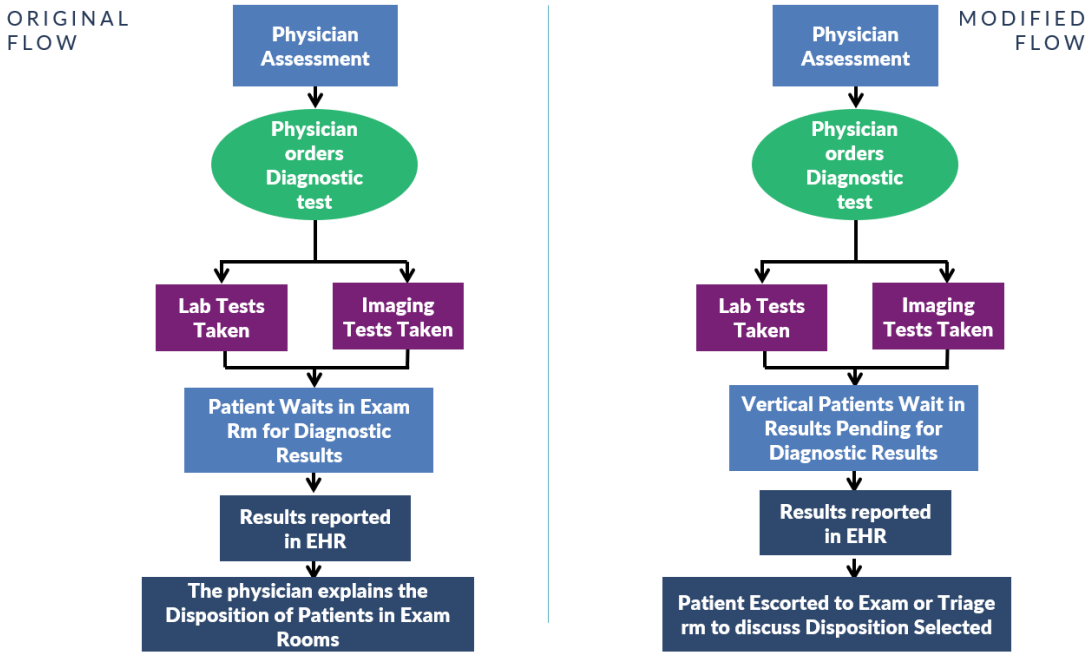

Figure 5 This figure compares the original and modified patient flow by implementing the results-pending improvement (Image Copyright: Author).

3. Results

The base model and the fast-admit scenarios were compared with the base model regarding patient LOS, Arrival-to-bed requests (order for admission), and Arrival-to-inpatient bed assigned milestones. Findings showed that the median LOS decreased by 16% and 6% for admitted and discharged patients, respectively (Figure 6). Further, Arrival-to-Bed request and Arrival-to-Bed-Assigned average minutes improved by 57% and 37%, respectively (Figure 7).

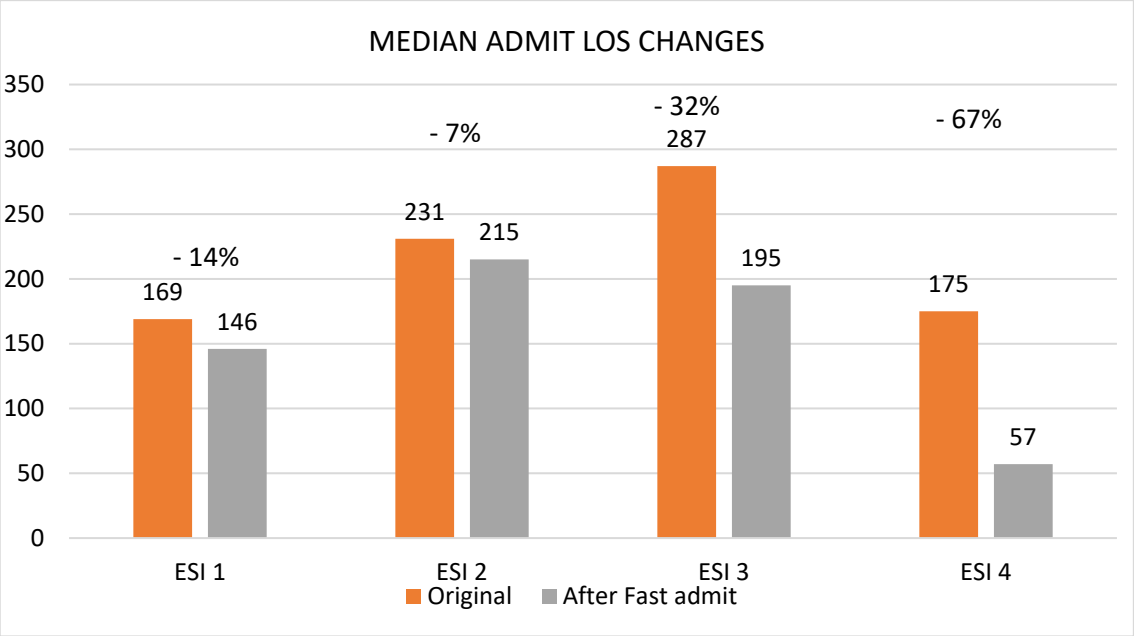

Figure 6 Median admit LOS comparison between the base model and after the Rapid-Admit modification (Image Copyright: Author).

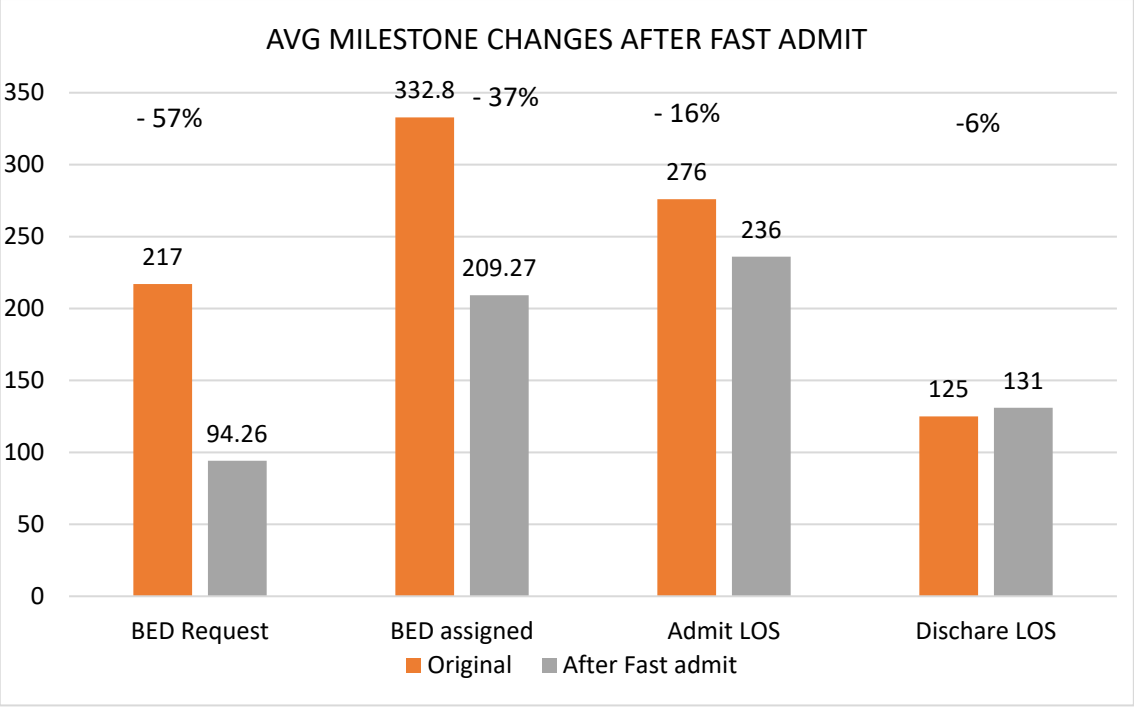

Figure 7 Average milestone changes after the rapid-admit adjustments (Image Copyright: Author).

Next, the model explored the impact of a results-pending strategy for low-acuity discharge patients. Figure 8 shows the average length of stay (LOS) times for admit patients, suggesting an average 32% reduction across all ESI levels (ESI 1 = - 20%, ESI 2 = - 20%, ESI 3 = - 37%, and ESI 4 = - 50% LOS variations from current to proposed state). Figure 9 shows the impact of this implication

on discharge patients across different ESI levels (ESI 2 = 0%, ESI 3 = 1%, ESI 4 = 4%, and ESI 5 = 0% variations from the current to the proposed state). The results pending implications did not substantially improve the discharge LOS (AVG increase by 1%). Additionally, this modification improved the exam room availability by 22% compared to the base model.

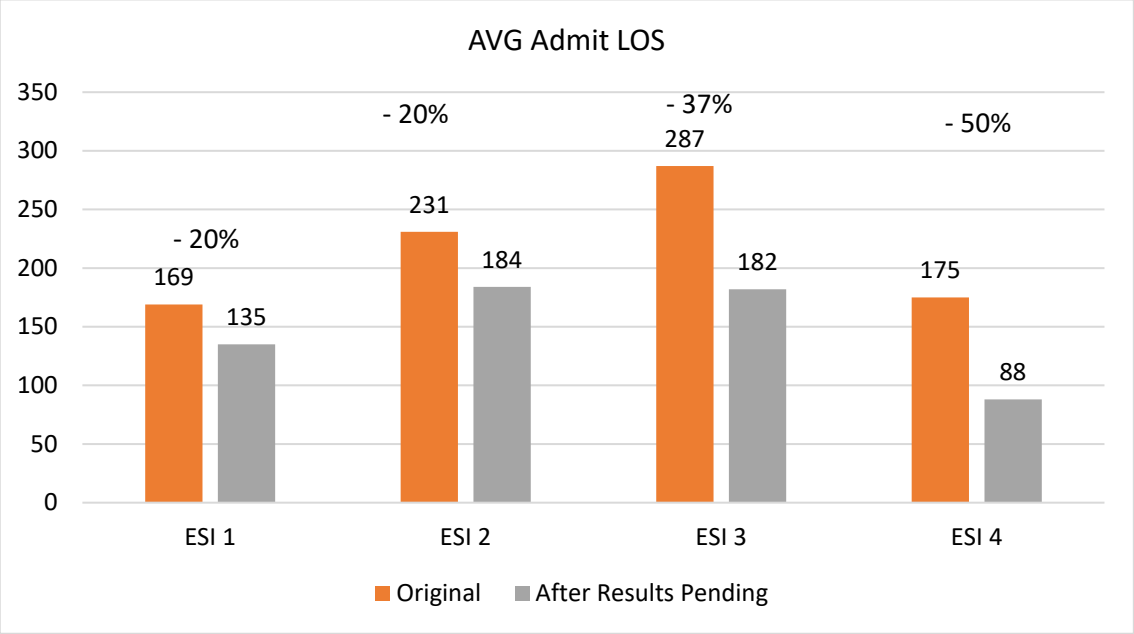

Figure8 Comparisons of average admit patient LOS across the base model and after the results-pending implementation (Image Copyright: Author).

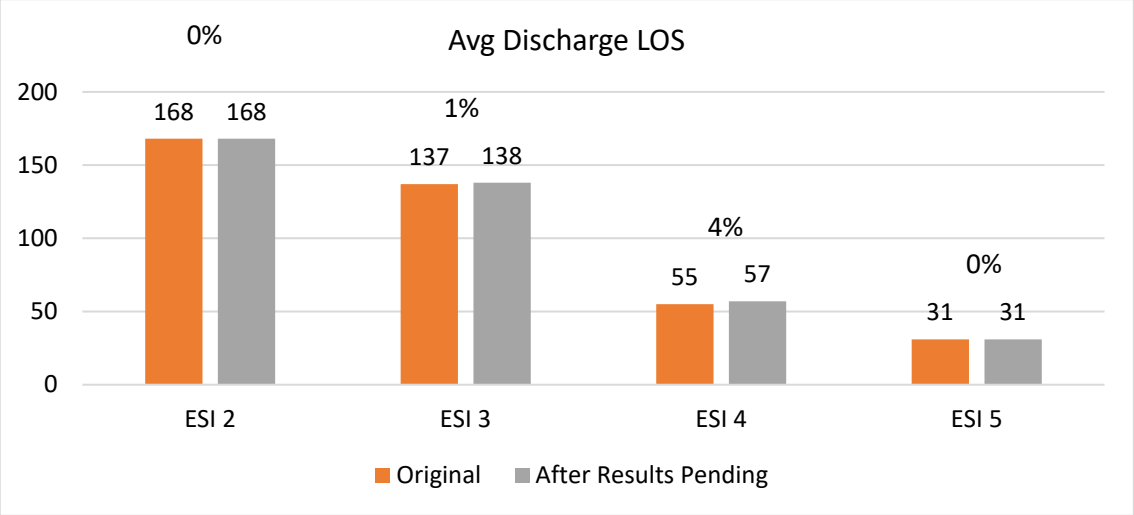

Figure 9 This diagram compares the average LOS for discharge patients before and after the results-pending implementation (Image Copyright: Author).

4. Discussion

A growing body of evidence suggests the association between ED crowding and unfavorable quality of care outcomes. These adverse outcomes include patients left without being seen, readmission, patient mortality, increased chances of admission or transfer, or reduced satisfaction (Amarasingham et al., 2010; Boulain et al., 2020; Quinn et al., 2007; Singer et al., 2011; Zilm et al., 2010). Therefore, suitable demand-capacity matching and adapted admission protocols are strategies for reducing ED patients' Length of Stay (LOS) and improving boarding times.

Improved boarding times associates with reduced ED crowding (Amarasingham et al., 2010; Patel et al., 2014). In their study, Patel et al. (2014) showed that a leadership-based program for

expediting the inpatient admission process for ED patients significantly decreased ED LOS and patient satisfaction.

Several scenarios may produce delayed boarding times, including inadequate inpatient beds, inadequate staffing, or prolonged room turnover. The introduction of rapid-admission protocol (RAP) recreates an essential milestone in ED flow and safety improvement. In this protocol, instead of fully completing all diagnostic tests before departure, the patient will be admitted to the hospital unit as soon as a bed is available, even before complete evaluations (Amarasingham et al., 2010). In their study, Amarasingham et al. (2010) explain how their team of clinical and administrative leaders developed a RAP to ease the transfer of admitted patients to the internal medicine service. After the protocol modifications, the overall ED boarding times decreased from 360 minutes to 270 minutes. Further, the time to admission orders was reduced from 210 minutes to 75 minutes after the intervention. Similarly, Quinn et al. (2007) found that the RAP implementation reduced the ED LOS by 10.1 minutes, resulting in an average of 4.3 hours of extra bed availability.

In agreement with previous reports (Amarasingham et al., 2010; Quinn et al., 2007; Spaite et al., 2002), the simulation results found reduced LOS for admitted patients when administering the RAP. However, healthcare facilities may struggle to implement RAP (Spaite et al., 2002). Successful implementation involves focusing on and developing change management planning, limiting clinical roles, requiring direct communication, and developing clear boundaries for patient responsibility (Amarasingham et al., 2010; Spaite et al., 2002). Future studies are recommended to explore potential barriers to executing RAP in EDs.

The limited health and design literature highlight physical space's importance in process ED outcomes. Aligned with the existing literature (Bryant, 2013; White et al., 2014; Zilm et al., 2010), the simulation results illustrated how the application of a results-pending room as an internal waiting area for low acuity patients reduced admit LOS and improved exam room availability for high acuity patients. For instance, Zilm et al. (2010) diverted low-acuity patients to a flexible "results-waiting" care area as one of their process intervention strategies. Combined with other strategies, this intervention reduced the number of Left without being seen (LWBS) and LOS. Bryant (2013) employed a retrospective descriptive comparative design showing that the average LOS for patients in the results-pending treatment areas was 31 minutes faster than those treated in intermediate care. This design implication can be integrated into future ED process improvement and system engineering interventions to reduce ED overcrowding.

DES is essential in healthcare settings to detect and evaluate healthcare systems' unpredictable and variable nature. The findings from this study displayed that the application of DES provides a cost-effective instrument to assess and inform future design decisions using current process data. Similar to previous studies (Cai & Jia, 2019; Han et al., 2010; Oh et al., 2016; Shim & Kumar, 2010b; Swan et al., 2019; Valipoor et al., 2021b), DES was notably worthwhile in evaluating the impact of multiple processes, design solutions, and proposing optimal scenarios for the ED.

Consistent with prior studies (Brailsford & Hilton, 2001), simulation modeling improved communication between researchers and healthcare professionals. Remarkably, the 3D environment of the FlexSIM software, combined with its video exportation capabilities, enhanced communication with the researcher, architects, and team members.

5. Limitations

Studies show that simulation applications in healthcare will continue to grow and strengthen. Despite the promising outlook of DES in healthcare studies (Cai & Jia, 2019; Mielczarek & Uziałko-Mydlikowska, 2012; Swan et al., 2019), its application still faces challenges. The implementation corresponds to how healthcare facility managers or decision-makers perceive the method's credibility and dependability. This information aligns with other researchers (Fone et al., 2003), highlighting only a few successful implementations of simulation modeling by health practitioners and policymakers. To improve this limitation, researchers need to educate and encourage owners

on the return on investments achieved by such studies in the preliminary phases of design development. Attributable to the limited sample size, the findings from this study would not allow for generalizability. While the outcomes measured may have suggested an association, they do not confirm causality. Future studies may benefit from a larger sample size or a more robust analysis considering different layouts and patient distributions.

6. Conclusion

If possible, discharge guidelines for Eds must reflect various ideas from evidence-based design research. Definitive evidence for health facility design remains relatively scarce, and there are still discussions on the evidence needed per project type or health system. While several investigations have explored the impact of patient flow strategies on ED process outcomes through DES, the examination of design alternatives and RAP on ED crowding needs to be more extensive. Thus, this study aimed to introduce and explore DES as a data-driven tool that may influence design decisions, improve internal and external communication, and suggest policy implementations.

RAP and Results-Pending strategies reduced boarding times and LOS for patients to be admitted, which are expected to enhance ED crowding, patient safety, and patient satisfaction. Further studies are suggested to explore patient and staff opinions of similar interventions. Design guidelines could emphasize recognizing results-pending spaces as a critical element for enhancing delivery and quality of care. Further investigation into the suitable size and attributes of a patient results-pending room is also necessary. While this study was conducted at one ED, the flow diagrams illustrated similar patient flows in other EDs. However, to generalize these findings, future studies should be repeated with an adequate representative sample of EDS across different regions, patient types, and demographics.

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Resume

Zahra Zamani is a senior design researcher and healthcare planner in BSA LifeStructures. Zahra is passionate about evaluating the impact of design and planning decisions on human experience, operational efficiency, satisfaction, health, and well-being. Zahra's research provides designers and planners with the best possible design solution to the problems after studying and analyzing the project content. She also enjoys exploring the human dimensions and anthropology, social needs, and comfort levels in connection to design. She has published and presented her research findings in multiple journal papers and international conferences, including Environmental Design Research Association (EDRA), NEOCON, Healthcare Systems Process Improvement (HSPI), and Healthcare Design Conference.

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Determination of appropriate areas in terms of bio comfort by using summer temperature index with the help of GIS throughout Ordu province

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Osama B Muragaa Alrabiti**

Abstract

Threshold values for climate elements have been determined and some indices have been developed, especially with studies on human comfort. It is a fact that the feeling of comfort is subjective and there are different psychological and physical factors affecting this feeling. However, the presentation of threshold values and indices is very interesting in determining the current state of the climate conditions of the environment in terms of average and optimal values and the extent of deviation from the most appropriate values. The values of the climate elements that need to be looked at in order to provide bioclimatic comfort; it as a combination of 21-27.5 °C temperature, 30-65% relative humidity and wind speed up to 5 m/s in open area. These values have been used in many bioclimatic assessments. In addition to being an effective factor in almost every aspect of people's lives, bio comfort is also important in the periods when tourism activities are carried out. Thus, it is extremely important to determine the regions that are not suitable for bio comfort in the season of tourism in the regions that tourism activities are carried out. The aim of this research is to determine the suitable and unsuitable areas in terms of bio comfort in summer by using New Summer Index throughout Ordu province via GIS. As a conclusion, it has been determined that the area covering approximately 57.62% of the southern part of the province is cold, and the most comfortable part of the province is the part covering approximately 11.12% of the province and located by the sea in the north of the province.

Keywords: summer temperature index, bio comfort, tourism, Ordu.

1. Introduction

Climate is an important factor that directly or indirectly affects the life of all living things on earth (Cesur et al. 2021; Varol et al. 2022). For human to feel comfortable, the environment may be in a wind range, humidity, and temperature, which is called “bioclimatic comfort” or simply “bio comfort” (Kilicoglu et al., 2020). In addition to factors such as people's workforce and productivity, activities in daily life, tourism activities, bio comfort is effective in many areas from the performance of the employees to the choice of the region where people will live and even energy efficiency (Feray et al., 2010; Gungor et al., 2021; Adiguzel et al., 2022; Kong et al 2019; Salata et al 2017; Sancar and Güngör 2020; Sevik et al. 2020a,b).

In order to determine the bioclimatic comfort situation in a space, first of all, it is necessary to determine and evaluate the radiation, relative humidity, wind conditions and temperature. Besides these basic factors, the number of hot days, precipitation, diseases and pests due to weather events, air pollution and the amount of oxygen in the atmosphere also affect human comfort.

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Bioclimatic comfort status can be determined by considering all of these effects. Bioclimatic comfort is the climatic conditions in which a person feels the healthiest and most dynamic. In other words, it is the conditions in which a person can adapt to his environment by spending the least amount of energy. The climate components that are important in providing bioclimatic comfort can be listed as temperature, relative humidity, radiation and wind. People feel more vigorous and comfortable in locations where climatic factors are more suitable for maintaining vital activities. The fact that these climatic factors are in suitable ranges for individuals is called bioclimatic comfort (Adiguzel et al., 2020).

There are many studies on the calculation of bioclimatic comfort for humans. Various formulas and indices have been created since the beginning of the last century, and human bioclimatic comfort conditions have been tried to be calculated by considering the factors that are thought to be effective on human bioclimatic comfort and the human characteristics. In this regard, Wetbulb temperature (Tw) index (Haldane's, 1905), designed to determine the thermal stress of miners in England, and is considered the first study. Epstein and Moran (2006), in their compilation study, stated that approximately 40 different and leading thermal comfort indices have been developed since 1905.

There are various indices used to determine suitable areas in terms of bio comfort and one or more of these indices are used following the purpose of the research. In this study, it was aimed to find the suitable and unsuitable areas in terms of bio comfort in summer by using the SSI (=New Summer Index) throughout Ordu province with the aim of GIS.

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find the suitable and unsuitable areas in terms of bio comfort in summer by using the SSI (=New Summer Index) throughout Ordu province with the aim of GIS.

2. Material and Method

The research was carried out throughout the city of Ordu. Ordu, one of Turkey's major cities, is located in the Black Sea region (Figure 1).

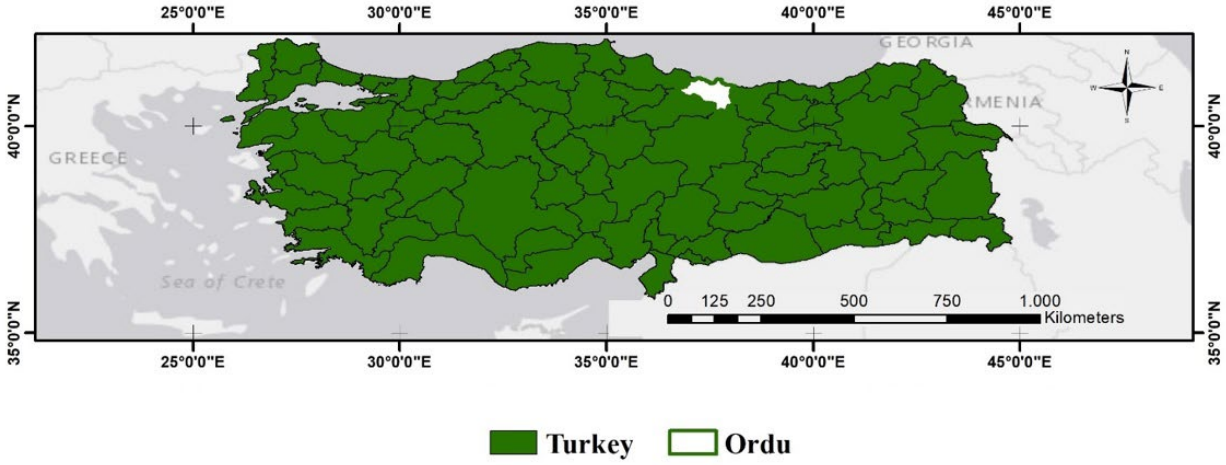

Figure 1 Ordu Location Map (Alrabiti 2023)

The situation of thermal comfort throughout the city was calculated using the SSI. In many studies, this index is preferred for determining bioclimatic comfort conditions for the summer months. Within the scope of the research, first of all, locations of meteorology stations and long-term climate parameters were obtained from relative humidity (%), temperature, meteorology stations, data were processed on the software of ArcGIS (Aricak, 2020). Arc map software was used to make climate maps with the "Inverse Distance Weighted (IDW)". IDW technique is the techniques among the methods of map generation by interpolation. It is an interpolation technique used to find the values of cell un-sampled points with the help of the values of known sample points. The formula used in this method is as follows:

$$z(x_o) = \frac{\sum_{i=1}^{n} z(x_i).\, d_{i0}^{-r}}{\sum_{i=1}^{n} d_{i0}^{-r}}$$

The location X0 from which the estimations are made is a function of neighbor measurements n (z(X0i) and i=1,2,…,n); r is the exponent determining the assigned range of each of the observations, and d is the distance separating the observation location Xi from the prediction location X0 (Kilicoglu et al., 2020; Adiguzel et al. 2022).

The maps of relative humidity and temperature produced by the interpolation method were created and evaluated by applying the SSI formula using the "Raster Calculator" command in the Arc map 10.5 scripts. The formula used in this step is given below.

SSI=1.98 * (Ta– ((0.55 - 0.0055 * RH) * (Ta-58))) - 56.83

3. Results

Maps showing the percentage of humidity throughout Ordu province in June, July, August, and September are given in Figure 2.

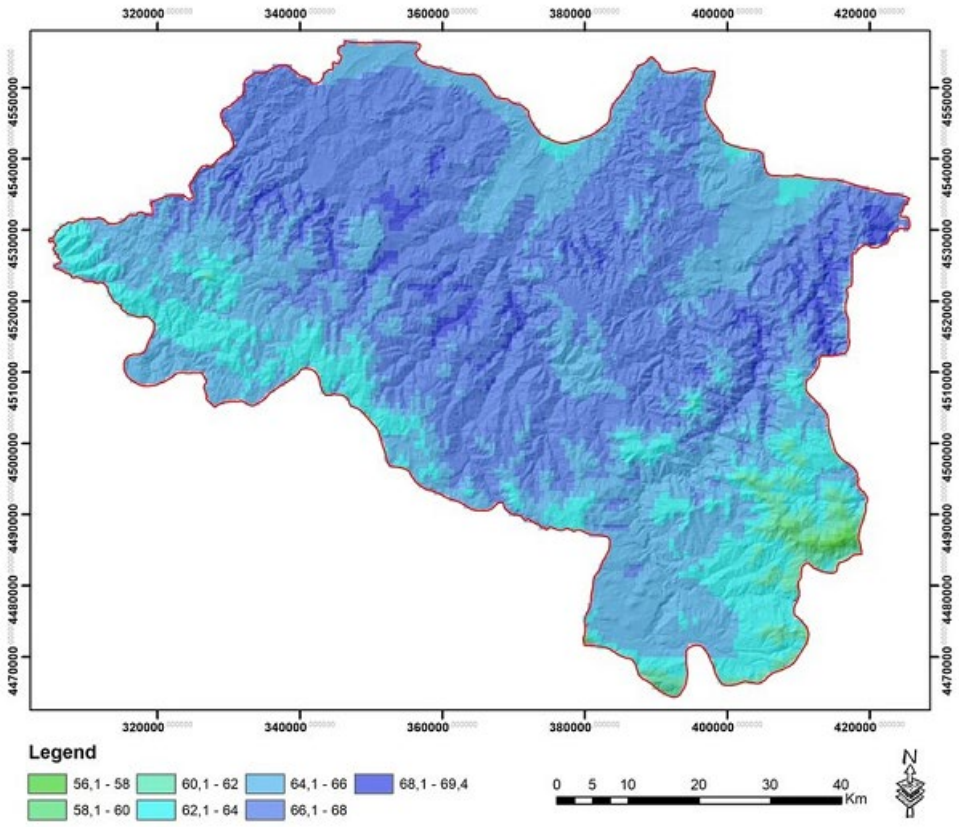

Figure 2 Percentage of Humidity in Ordu Province in Summer (Alrabiti 2023)

When Figure 2 is examined, it is seen that the humidity is between 56.1% and 69.4% in the four months in general, the parts with the lowest humidity are in the southeast of the province, and the parts with the highest level are in the middle part. As a result of the calculations, it has been calculated that the humidity percentage, which is below 58% in approximately 0.12% of the province, is above 68% in approximately 3.67% of the province. Apart from this, the percentage of humidity is in the range of 66-68% in approximately 45.75% of the province, in the range of 64-66% in 34.41%, between 62-64% in 13%, 60-62% in 2.59% of the province. It was calculated that it was in the range of 58-60% in the range of 0.46% and the range of 0.46%. The map showing the average temperature throughout the province during the summer months in the study area is given in Figure 3.

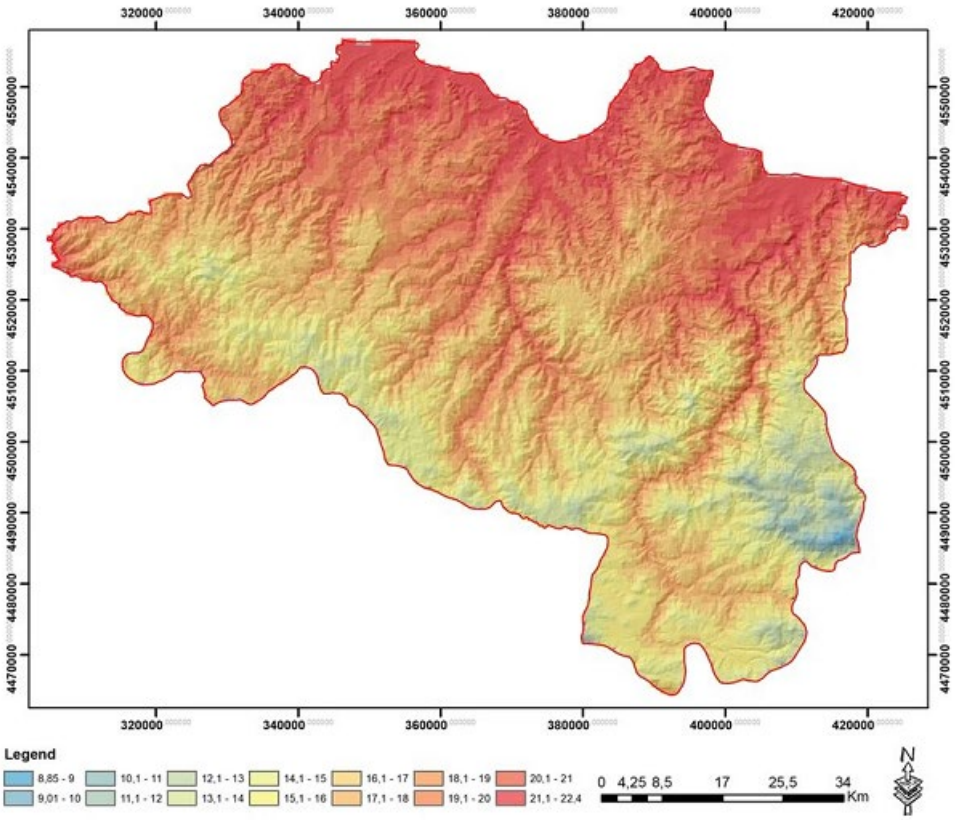

Figure 3 Average Temperature in Ordu Province in Summer (Alrabiti 2023)

When the map showing the average temperature in the summer months is examined, it is seen that the warmest parts of the province are generally the northern parts, the average temperature decreases from the north to the south, and the coolest parts of the province are the southwest. According to the calculations, the average temperature in summer is below 13 °C in approximately 2.88% of the province and above 20 °C in 24.91% of the province. In approximately 14.31% of the province, the temperature is between 16-17 °C. By using the values of humidity and temperature, the values of SSI and belts were evaluated throughout the city, and the comfort status for the summer months is given in Figure 4.

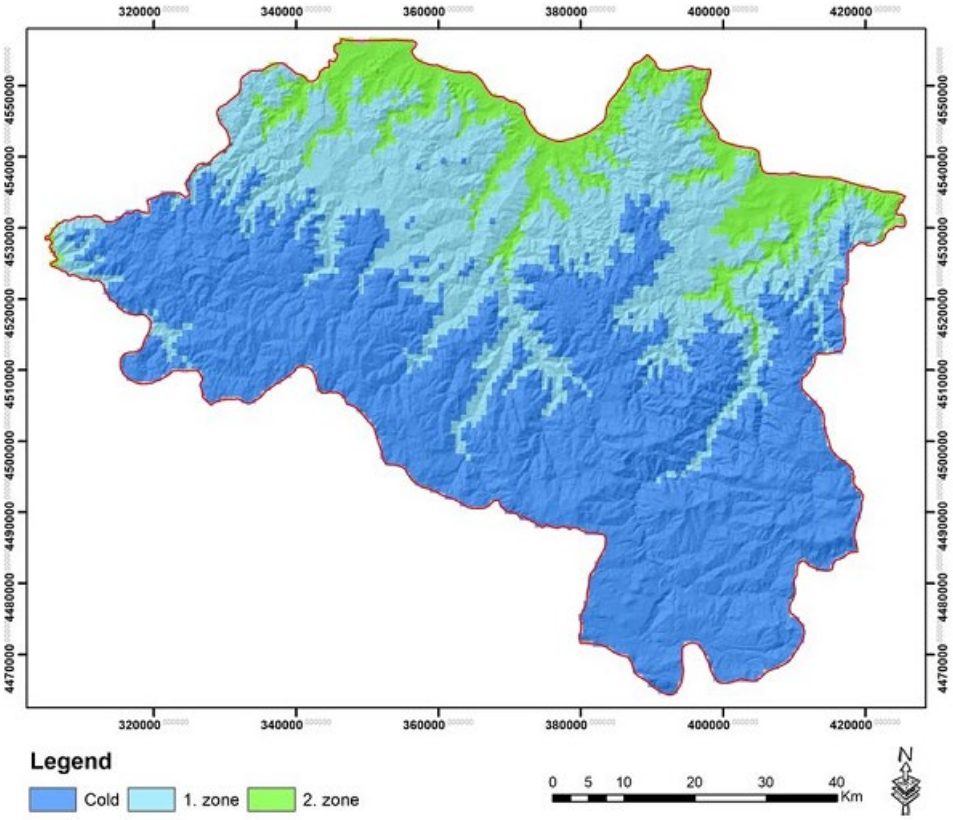

Figure 4 Comfort in Ordu Province in Summer (Alrabiti 2023)

According to the results of the research, it was found that there were three generations in Ordu during the summer months. When the map is found, it is shown that the area covering approximately 57.62% of the southern part of the province is cold. The 2nd Zone, which is located in the north of the province and where most people feel comfortable, covers approximately 11.12% of the province in general. The area between the two regions and covering approximately 31.26% of the province is in Zone 1, where is comfortable and cold.

4. Discussions

People are warm-blooded creatures and therefore they feel uncomfortable in that environment when the outdoor conditions are not within certain intervals (Zeren Cetin and Sevik, 2020; Zhao 2020; Kilicoglu, 2022). People's comfort is affected by factors for example: air pollution, particulate matter, CO2 concentration, which are not easily perceived by the five senses, as well as factors such as noise, smell, and light.

Cetin (2015) derived and evaluated temperature values with a resolution of 1x1 km in his study named “Determining the bioclimatic comfort in Kastamonu City”. By overlapping the derived temperature values with the humidity values, the felt temperature values were derived and mapped these values.

However, the most important parameters affecting all vital activities of living things are temperature and precipitation (Yucedag et al., 2018; Zhu et al. 2019; Koç, 2021a,b; Kong et al 2019; Salata et al 2017; Sancar and Güngör 2020; Sevik et al. 2020a,b; Zeren Cetin et al. 2020; Zeren Cetin et al., 2022). Similarly, temperature and humidity, which are the basic climatic parameters, are at the forefront of the conditions affecting human comfort (Kilicoglu et al., 2020; Kong et al 2019; Salata et al 2017; Sancar and Güngör 2020). In terms of the continuity of human life, especially the temperature value must be within certain ranges. The temperature values within certain ranges with both various clothes and heating or cooling equipment (Kilicoglu et al., 2021; Kong et al 2019;

Salata et al 2017; Sancar and Güngör 2020). Some of these research used the climate data of annual average, while others used monthly or seasonal average data (Kaya et al., 2019; Kong et al 2019; Salata et al 2017; Sancar and Güngör 2020).

Cetin, M., Topay, M., Kaya, L. G., & Yılmaz, B.'s 2010 study titled " Efficiency of bioclimatic comfort in landscape planning process: case of Kutahya" examined the bioclimatic conditions in areas of the city center with different land textures. In the study, the Physiological Equivalent Temperature (FES), is in its calculations in addition to the meteorological parameters, was used. The hourly thermal sensing values of 6 meteorological stations in the period 2001-2010 were evaluated.

In the study conducted by Adiguzel et al. (2020), five areas with different characteristics were determined in Hatay city center, which is a high altitude and crowded city in the Mediterranean Region of Turkey. In order to calculate the bioclimatic comfort values in these areas, meteorological data covering the hours of 00:00, 03:00, 06:00, 09:00, 12:00, 15:00, 18:00 and 21:00 daily parameters are taken. These parameters were obtained from meteorological measuring devices installed in five urban areas and from station, which was taken as a reference. In the study, FES index and RayMan 2.1 model were used to calculate bioclimatic comfort conditions. Because of the research, it has been revealed that there are "very cold stress" and "very hot stress intervals" in Hatay during the summer months.

Cetin et al. (2019), in his study in the city center of Burdur, obtained climatic data of the study area through a portable meteorology station and calculated bioclimatic comfort using these data. The study used the Physiological Equivalent Temperature (FES)-Physiological Equivalent Temperature (PET)-index and the RayMan 2.1 program to calculate the bioclimatic comfort conditions.

Cetin (2020), in his study, took temperature, humidity and wind data from stations belonging to Kahramanmaras province and its surroundings, evaluated these data with the IDW technique and created climate maps. Then, with the overlay analysis, he revealed the comfort areas in terms of bioclimatic.

5. Conclusions

It has been compared with the same dated ground station measurements obtained from the General Directorate of Meteorology. It was observed that the difference between the temperature measurements obtained from the meteorology station located within the provincial borders and the temperature values calculated with the satellite data was 0.2 degrees Celsius (absolute) at the lowest station and 4.1 degrees Celsius (absolute) at the highest station. It has been determined that the temperature values obtained from the Ground Surface Temperature (LST) algorithm applied in the study are within the limits of sufficient accuracy.

The research, suitable areas to bio comfort were determined with the aim of the summer temperature index by using temperature values and humidity in the summer months throughout Ordu. As a conclude of the calculations, it has been determined that most of the city, in general, is in the cold zone, the most comfortable areas in the province are located in the coastal part of the north of the province and it covers approximately 11.12% of the province.

Evaluating of the bioclimatic comfort structure within the borders of the province, the annual climatic values required should be averaged and overlapped. According to the results obtained from this superposition, the areas where the settlement area located in the province and its borders have suitable climatic values in terms of human comfort are determined. Thus, it will help to plan suitable urban open green spaces for this study.

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Resume

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Who is designing for whom? A critical design studio approach

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Abstract

Studio studies can easily be defined as the cornerstone of the discipline in departments giving architectural education. Although the educational process differs in educational institutions and among the educators, its main purpose is always to give the best experience on design process to the students and to bring together different space designs and functions with certain criteria. Although it is often stated to the contrary, it is generally difficult to get the necessary support from the social sciences in studio work. For students, considering the design with sociological data and creating a concept can be perceived as a waste of time, since the user experience cannot be observed in a project that will not be implemented in the real life and it will often create differences that cannot be measured. Dealing with form, color, and material instead can help impress teachers and other students in the studio much more easily. Students often act pragmatically and choose the method that promises them a higher score in a shorter way, as creating a charming product in studio will seem more powerful while a deep research on the sociologic and ecologic background cannot reflect themselves easily on a render. Although very different user profiles were determined for the same area at the beginning of the design process, it may cause that the resulting products cannot create enough characteristic differences in the end. The aim of this research is to examine whether the projects differ in terms of functionality regarding their different user profiles determined by the students, based on the studio work of Karadeniz Technical University, Department of Landscape Architecture within the scope of Environmental Design and Project II course. As a result of the examination, it has been determined that although the designer and customer profile are different, the morphological differences in designs are not perceived very easily, which means the methodology in the studios should be examined again.

Keywords: environmental design and project, landscape architecture education, landscape studio

1. Introduction

As the discipline of landscape architecture expands and interacts with other disciplines, it needs to broaden and deepen academic thinking (Deming and Swaffield, 2011). Accordingly, the necessity for landscape architecture, as a maturing academic discipline, to develop its methodological repertoire urgently in order to produce new knowledge has become inevitable in recent years (Lenzholzer, Duchhart and Koh, 2013; van den Brink and Bruns, 2014).

Landscape design studios have an important place in landscape architecture education in terms of encouraging creativity and helping students produce original design solutions. Although design as a product is a concrete output of the teaching and learning situation provided by the studio, the main purpose is to explain how design as a process should work (Wingren, 2019). Although the

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design is a certain result, the abstractness of the process that leads the designer to this result cannot be ignored.

The basis of design education should be on how the process will work, not on what the result should be. Creativity that emerges in this process has a cognitive structure and includes the stages of discovery-production (Özkan, Alpak and Regular, 2016).

Design studios creates the core of architecture and landscape architecture education. Developing both as a space and as a pedagogical environment, studio work, content and methodology show significant differences among schools and educators (Alon-Mozes, 2006). The main reason for this is that the design discipline, unlike other disciplines, focuses on the desired and imagined results rather than principles and theories (Akın, 2002).

Environmental comfort and sustainability problems have increased the need for science and technical education. Social approaches that include sensitivity to the relationship between human behavior and the built environment elements should also be instilled in studio work (Kowaltowski, Bianchi and De Paiva, 2010).

It is extremely important and necessary to be able to realize learning in design education. Learning is a process that takes place in mutual interaction and students who have a successful learning process can realize successful designs that reveal original and qualified products. Thus, methods and techniques in the learning phase that affect and make learning understandable gain importance in design education (Acar and Bekar, 2017; Kahveci and Göker, 2020).

Throughout the process, there is a holistic learning in which design knowledge is shaped as a result of accumulation. In these processes, a delicate balance is maintained between directing students to acquire knowledge and experience and producing original thoughts with the individual thoughts of the students (Dinçer, Temel and Öztürk, 2021). In addition, it will be a starting point that will improve education if design studio executives accept that designing and learning are different skills (Arıdağ and Aslan, 2012).

In this study, the designs made by 5 students within the scope of Karadeniz Technical University Environmental Design and Project II course were discussed and the reflection of cultural difference and designer difference on space-activity differences was investigated.

2. Material and Method

2.1. Studio chart

The purpose of studio work is to equip students with a basic framework that they can use in any future design work. The present study was carried out in the studio of Karadeniz Technical University, Department of Landscape Architecture, within the scope of Environmental Design and Project II course.

Within the scope of the study, the studio work was divided into 3 main stages;

Students were asked to identify a famous person from Turkey or the world and design a residential garden based on that person. This makes the process faster and more realistic as otherwise the students would spend extra time to create scenarios and put some responsibilities on their characters' shoulders.

They examined various examples of spaces that open or closed spaces embody in the landscape,

Finally, each student was asked to create their own story/design in a residential garden based on the previous two phases (Figure 1).

Figure 1 Studio chart

Within the scope of the study, five students' projects were selected, and these projects formed the basis of the research. This design process is spread over a 16-week semester

2.2. Field Survey

Before starting the studio work, first of all, field analysis was made and natural, cultural and climatic factors were included in the study. With the SWOT analysis, the strengths and weaknesses of the area, the advantages and disadvantages it offers were determined and recorded on the survey sheet (Figure 2). Slope groups and aspect, close environment characteristics, plants in the area were determined precisely. Since the location of the residence on a dominant hill within the KTU campus, it is important both when looking at the area from the outside and when looking out from the area, a visibility analysis was also carried out.

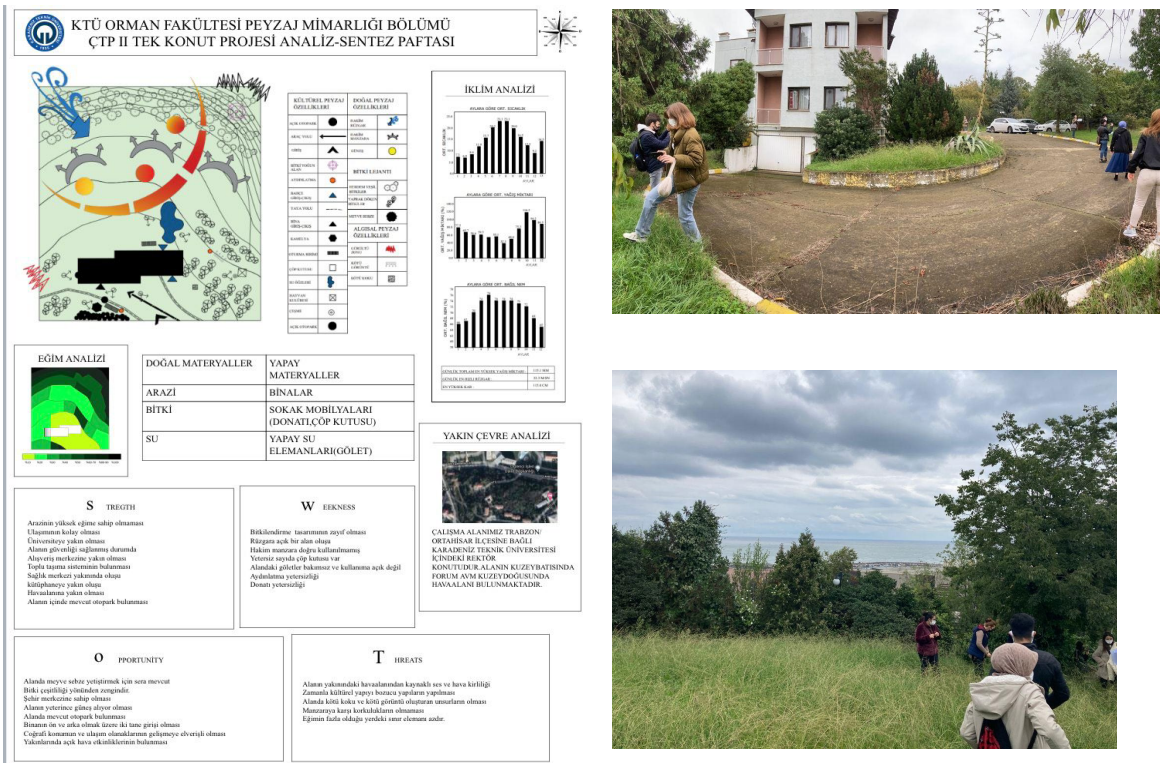


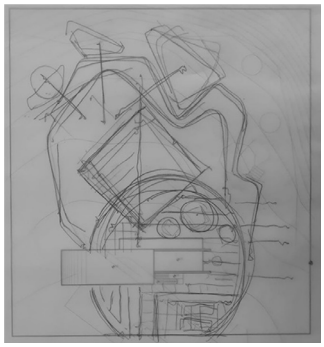
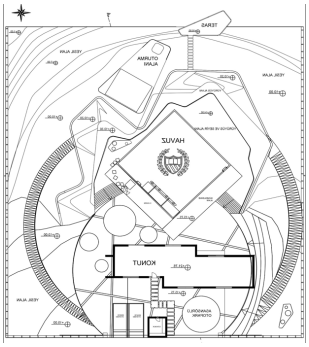
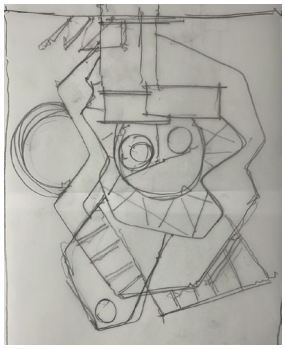
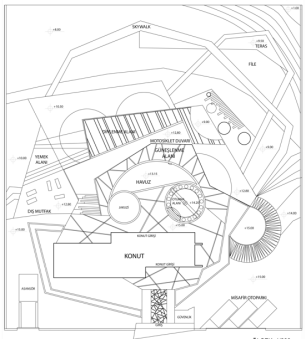
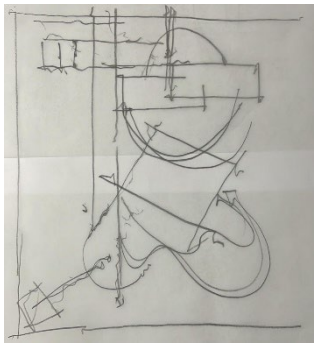
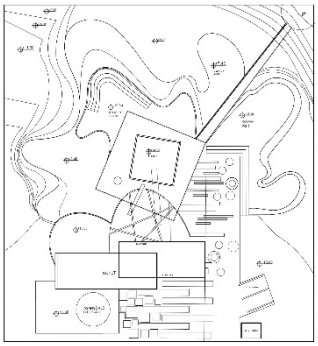
Figure 2 Survey posters and photos from the field analysis

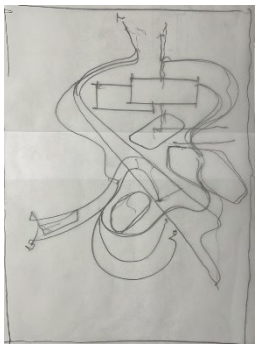
2.3. Studio Designs

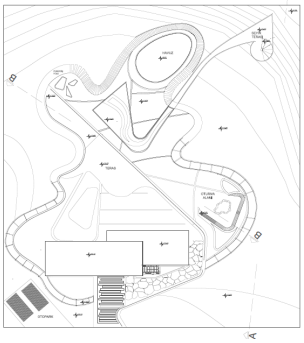
The students, who completed the analysis studies by processing the land data, were asked to determine who would be their users, in other words, who would be the owners of the houses. Each student is held responsible for creating a scenario for the famous person they choose to move to Trabzon. For example, if a world-famous football player is to be chosen, he has been Trabzonspor's infrastructure manager for 10 years after he quit football, and if a famous actor is to be preferred, he wants to stay out of sight for a while. Thus, it is aimed to diversify the basic needs of their daily lives, visitors and accordingly, to show serious differences in designs from each other.

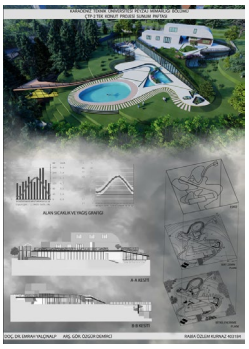
At the end of the studio, the design processes of 5 students were picked up. Among the design students, Hamza Duman took Will Smith, Nurseli Alptekin Ryan Raynolds, Özlem Arslan Shakira, Özlem Kurnaz Betül Mardin and Melisa Başak Hayko Cepkin as examples. Because students prefer users from different sectors who have adopted different lifestyles, it was found promising that the final products would clearly reveal their differences in functions. (Table 1).

Table 1 Sketchs, designs, presentations, designers and users

Sketch	Design	Presentation	Designer and User
			Designer: Hamza Duman User Will Smith
			Designer: Nurseli Alptekin User: Ryan Raynolds
			Designer: Özlem Arslan User Shakira





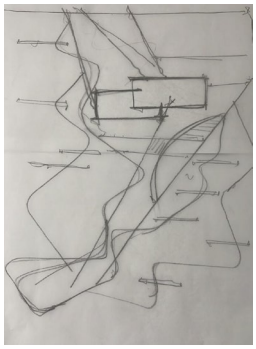


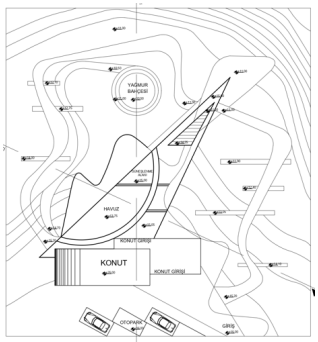
Designer:

Özlem Kurnaz

User

Betül Mardin





Designer:

Melisa Beşik

User:

Hayko Cepkin

3. Discussion and Conclusion

For the development of landscape design, it is necessary to translate specialized knowledge (hydrology, climatology, ecology, environmental psychology) into applicable design guidelines and to develop academically accepted research methods specific to the discipline of landscape architecture. This approach for design will make important contributions to the design processes and the product to be obtained in landscape architecture education, especially in studio work.

When the design process was considered in detail, it was thought that the collaborative work of the students while revealing the possibilities of the field affected the final design more than the user characteristics. Very normal reasons such as the fact that there is only a part to create a swimming pool due to the aspect and slope groups of the area can be effective on that. Because in spite of the fact that chosen users come from different socio-cultural environments, ultimately every user may want to own a swimming pool and it has a great effect on forming the landscape as it is a very effective component in shaping the design of a relatively small residential garden. However, although the forms differ, the fact that the functions reveal similar spaces such as patios, terraces, pools, hobby gardens, recreation areas and garages has caused the education process to be questioned. The fact that there is no big difference between a single singer who is expected to take the stage at parties with his friends and an author who is expected to prefer to live a quieter life in his life at the age of 90 has been interpreted as the fact that students care more about the works that will give good photographs with a pragmatic approach than design for the users. As a result, it was seen that the students who preferred different user groups could not reflect different cultures in their designs and the functions were quite similar.

Philosopher Wolfgang Welsch attributes this to our living in an intercultural context and says, “Lifestyles no longer stop at the borders of national cultures, they go beyond them. There is no such thing as an absolute stranger anymore.” He states that cultural differences have disappeared (Welsch, 1999; Chang, 2005). The results obtained in the studio may have eliminated the difference in perception of life between famous people, depending on Welsch's statement, and the fact that the difference in perception between designers no longer exists may have led to the same result. In other words, the similarity obtained may be due to the fact that similar demands were met with

a correct analysis and design approach. However, the same result can be achieved by designers living similar lives in similar socioeconomic environments, finding a "shortcut" way and being more influenced by each other than they should be. Although Yilmaz et al., (2016) states that carrying out the process through an imaginary design means both the development of students' imagination and the development of their formal repertoire; Learning from the problems, difficulties and tasks in the landscape, interacting with real stakeholders from institutions and organizations will enable students to approach daily practices and increase their motivation. In addition, this practice will provide students with skills and social competences that cannot be taught in the studio environment, such as teamwork, time management, design communication, presentation and discussion of projects.

There is a need for new strategies that transcend disciplinary boundaries in studio education and motivate students to think critically about the dynamic relationship between space, time and social practices (Chen and Lee, 2015). How the education process should be has been open to discussion since the day the professional discipline was acquired. It is important to provide students with style, method, critical thinking skills and to develop their social aspects as well as creativity.

Özkan, Alpak and Düzenli (2016) and Alpak, Özkan and Düzenli (2018) state that students should be aware of the subject, conduct a literature review, collect necessary information and data, and solve the problem so that they can produce creative and original designs in studio work. They argue that as a result of their evaluation, colleagues who will create systematic and quality urban spaces can be trained. However, the social communication skills required not only for the discipline of landscape architecture, but also for all professional disciplines and the approaches to analyze user requests well can be ignored due to the conditions of the current period in which all we have been. The process of returning to the “old life" right after the pandemic can make our perception and patience difficult. Since both the designer and the user are human, analyzing the human as a whole, knowing his behaviors and their reasons may be the main thing to do before analyzing a specific user group.

As a result, while it is ironic enough that the outer world is designed from the “inner world” in a room, it is important and necessary that there are quests in design beyond the forms and standard needs lists. Otherwise, an understanding of marketing the same functions to users in renders where forms, colors and textures look different will be a serious threat to the existence of all design-based professions.

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Resume

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