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Evaluation of a Public Open Space Depending on User Behaviour in the Post Occupancy Phase

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Abstract
This study analysed the evaluation of a public open space based on user behaviour in the occupancy phase. The study further analysed to what extent the design projects prepared for the study area satisfied the needs of the users in the post occupancy, and the methods of behavioural observations, environmental measurements and interviews were used in the study. Behaviour observations were performed on a total of 7.896 users in 9 sub - spaces, for a period of nine days between the dates of 18 April - 15 May in Izmir Konak Square. The temperature, humidity and wind strength in the area concerning on the observation days was recorded on the commencement of each observation period. This information revealed the relationship between climatic data and user behaviour. The study was completed with the interviews made with designer and implementing firms. It was found that the space brings together people from every age group and different social groups; the space is mostly used for shopping, socio - cultural activities, transit, short - term relaxation, meeting, gathering and dining and although limited, it offered the users the opportunity of coming together. Unlike what was expected, it was found that the space was not alive for 24 hours.

Key Words: *Public open space, Post 0ccupancy evaluation, İzmir City, Konak Square*

INTRODUCTION

Public open spaces, which constitute the most important section of cities, are also important indicators of environment and quality of life in modern societies (Kucukerbas ve Ozkan, 1999). Public spaces create an image for the city in which they are located; they become a meeting place, and a centre for various activities that improve the physical and social environment (Rubenstein, 1992).

Depending on outdoor space life, these kinds of activities can only be performed in line with the appropriateness and quality of the space Erdonmez and Aki, 2005); in a good environment, broad spectrum of user activities is possible (Gehl, 2006). Determination of the most suitable structured forms for users is only possible with the evaluation of the various stages of design process and their alternatives (Lawrence, 1987) and by making and putting into effect spatial policies.

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When the city of Izmir is evaluated in this way, it is seen that the working process does not include the policy - making, planning, designing and application stages. In other words, works on public sites are generally solitary applications based on action showing a structure away from a comprehensive approach. In addition, interdisciplinary works with multiple actors are not performed, and antidemocratic and individual applications can be seen.

Konak Square, the study area, was also redesigned in a similar way in 2003 - individualistic and antidemocratic. The Square, having a distinct place in the history of the city, dates back to 1800s as being a site of either political or social transformation.

Konak Square, which may serve as the heart of the city by being a public centre, was redesigned by the Grand Municipality as a prestige project in order to reinvigorate historical memory by emphasizing on the remarks at the square, reveal functionally and physically the cross - section of old commercial centre and newly constructed areas, construct sustainable and flexible site chains meeting the needs of different programs, contribute to close relationship of city with sea (Ege Mimarlık, 2004).

The present study aimed to investigate whether the Square reached ideal conditions after being exposed to physical changes and transformations in time and how livable it has become at the end of this transformation process. The study is also especially important because it is the first known doctoral study in the landscape architecture discipline, deals with an absolute outer environment, where environment conditions are effective, and plays a leading role for future studies.

In this respect, the aims of study are:

- ✓ To determine the density and variety of activities by investigating the used and unused parts of the space,
- ✓ To investigate and determine how the space is perceived by the users and how it meets their needs and expectations based on their opinions and the reasons for their dissatisfaction,
- ✓ To determine the possible effects of environmental impacts on use density and activity variety in the space,
- ✓ To investigate whether the space where users directly or indirectly interact is still the public centre of the city, and
- ✓ To increase the quality of space offering suggestions on the study area and thus the attractiveness force and use of public space.

STUDY AREA

The study area is the Konak Square and its close proximity, which is surrounded by historical, cultural, commercial, administrative, and military buildings and the transportation network (Figure 1).

The area known as ‘Konak Square’ today, where the Clock Tower is placed in the centre as the symbol of Izmir was located outside the boundaries of the settlements that were developed around the inner bay until the end of the eighteenth century. The evolution of Konak Square as well as its environs has taken place only after the end of the first quarter of the nineteenth century. The area gained importance due to its location and its status as the administrative centre, which grew with the increase in urban population, growth, and widespread development that occurred with changing world conditions in the nineteenth century. The Square has adopted a series of identities before becoming what it is now (Eyuce, 2005).

Figure 1. *Konak Square - 2008 (Arkitera, 2006)*

Konak Square and its vicinity was selected to be the study area because it has a 200 - year history extending from 1800s; it is an important public centre for Izmir city; there is a diversity of users and activities; and it has been exposed to inconceivable changes and transformations having taken place in it; and at the last stages of this process, it gained the present form. Although all of the area has been accepted and named as Konak Square by the citizens, it was designed as a combination of a park and a square in 2003.

METHODS

The method of the study consisted of four stages: definition of the subject and the problem, data collection, findings and analysis, and evaluation and synthesis (Figure 2).

It was used behaviour mapping, environmental measurement and interview methods in this study. During the preparation of the observation form that was used for behaviour mapping, studies by Dinc and Onat (2002), Friedmann et al. (1985), Given and Leckie (2003), Karen and Tranter (2003), Sanoff (1977), Sanoff (1992), Shepley and Wilson (1999), Tantan (1996), Tilley et al. (1996), Oymen and Gur (1996), Yildiz (2004), Zacharias et al. (2004), and Zeisel (1995) were referenced as sources (Table 1).

Table 1*. Observation form*

OBSERVATION FORM																							
Date			**Period**						**Sub - Spaces**														
Temperature									**S1**		**S2**		**S3**										
Humidity									**S4**		**S5**		**S6**										
Wind Strength									**S7**		**S8**		**S9**										
			User Information						***Activities***														
			Gender		***Age***				***Active***							***Passive***							
Observation Number	Social Interaction (SU, PU, TP, SG, LG)	User Behaviour (SF, OU, VU, AU, O)	Male	Female	0 – 6	7 – 18	19 – 60	60 +	Walking	Shopping	Cycling	Running	Fishing	Skating	Photograph	Sitting	Waiting	Reading	Talking	Eating - Drinking			

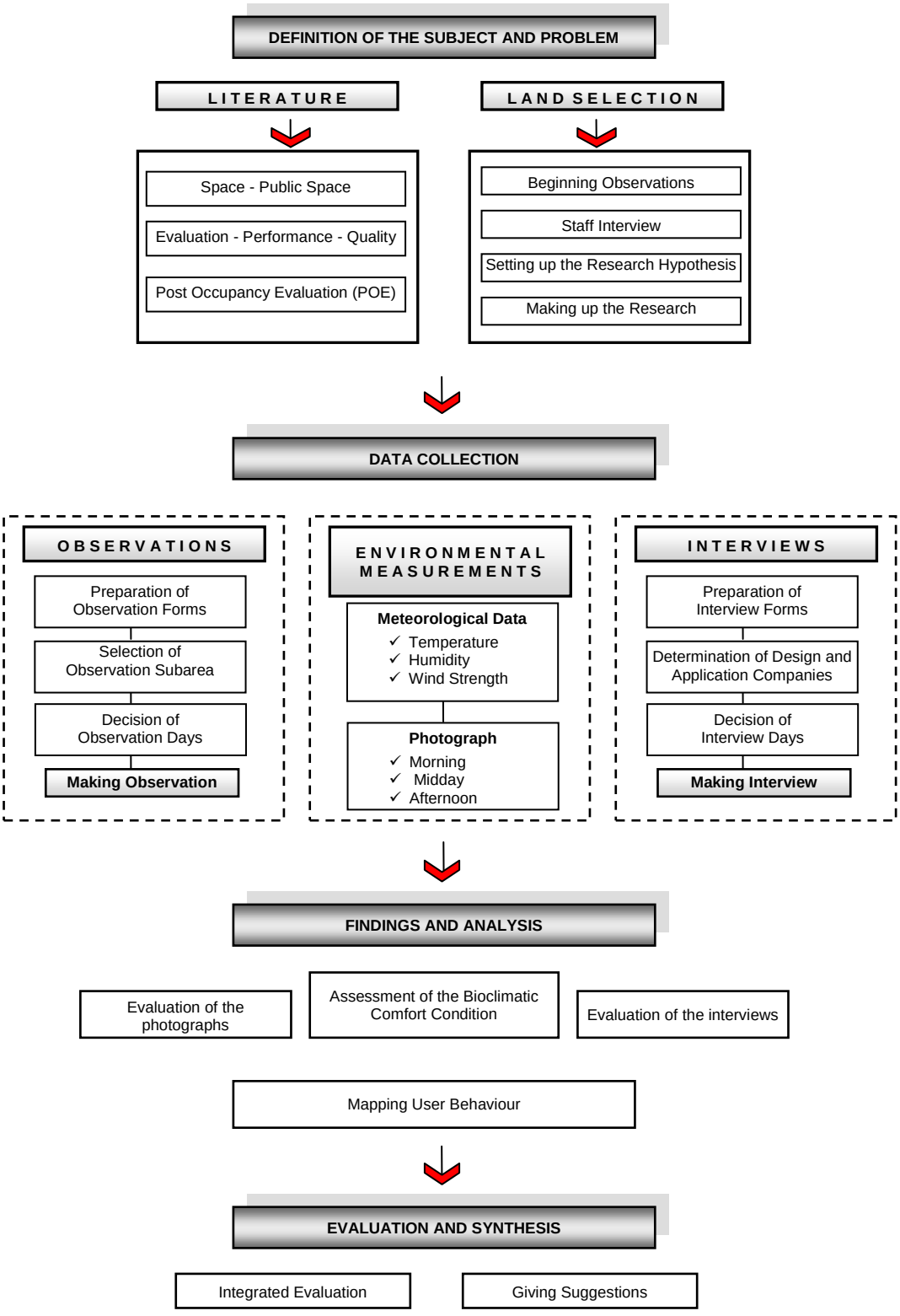

Figure 2. *Method flow diagram*

7.896 users were observed in April and May by considering and decreasing the negative effects of temperature and humidity on user activity and density. During the selection of observation days, national festival days, which increase the occupancy of public space, were not selected, and thus misleading observation results were avoided. Furthermore, each week, a different weekday was selected to avoid potential mistakes.

In preliminary observations conducted for the study area, a total of 9 sub - spaces were identified and sub - spaces was defined in abbreviations in the observation form: **S1** (Ayşe Hatun Mosque and Environs), **S2** (Historical Clock Tower and Old Konak Square), **S3** (The Old Promenade, **S4** (Urban History Park - Pool Area), **S5** (Urban History Park - Open Exhibition Area), **S6** (Aegean Artists Meeting Park), **S7** (The Old Booksellers Street), **S8** (Promenade - Ship Exhibition Area), and **S9** (Promenade - Watching Terrace) (Figure 3).

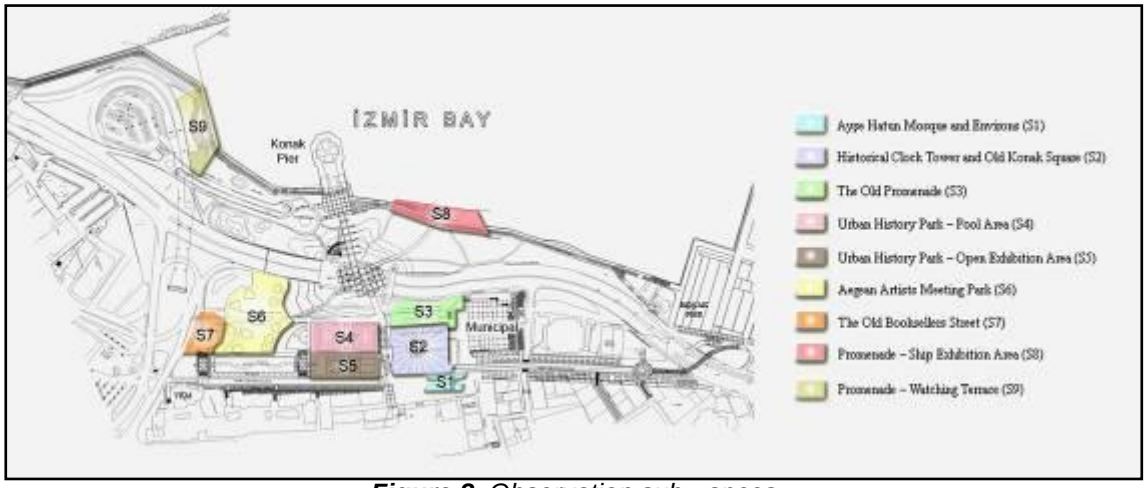

Figure 3. *Observation sub - spces*

At the stage of determination of sub - spaces, subspace approaches in the application project were evaluated, in addition to user behaviour and activities. During the observation of the sub - spaces, the first sub - space to be observed was changed each time to allow for rotation, and thus it was possible to relate the observations with the previous observation. Social interaction types defined with abbreviations in the observation form are: **SU** (Solitary User), **PK** (Parallel User), **TP** (Two People), **SG** (Small Group) and **LG** (Large Group). User behavior types employed in observation with abbreviations were: **SF** (Self Focused), **OU** (Observing User), **VU** (Verbally User), **AU** (Active User), and **O** (Others).

Furthermore, temperature, humidity and wind strength data collected from the Izmir Regional Directorate of Meteorology were recorded at the beginning of each observation period, and the relationship between biologic comfort conditions and user behaviour was analysed. The data obtained from the behaviour observations in sub - spaces were processed into the tables, which were specifically created for each sub - space. The table indicated the activities identified in the observed sub - spaces, as well as their positive and negative physical characteristics.

In addition to the behaviour mapping and environmental measurement methods, the interview method was also used in the study. In this context, the designer and the implementing firms were interviewed through the pre - prepared interview forms.

FINDINGS AND ANALYSIS

Findings obtained from observations

During the observations, a total of 7.896 users - 2.807 of whom were female and 5.089 of whom were male - were observed. The age distribution of the users was categorized into 4 groups as Table 2.

Table 2. *The distribution of users by age*

Male				Female			
0 - 6	**7 - 18**	**19 - 60**	**60 +**	**0 - 6**	**7 - 18**	**19 - 60**	**60 +**
283	551	3195	685	239	388	1798	157

According to the observations conducted at each sub - space, 74 % of the spaces were observed to be intensively used in observation periods in the evening. As for the distribution of the users in the general of the study area: it was found that S2, S3 and S4 were the most intensively used sub - spaces and that the users used these spaces particularly in two - people or in small groups; later, the number of solitary users increased.

In addition to the mostly observed two - people and solitary users in the area, particularly at weekends, soldier groups, tourist groups and picnicking families were most common. On occasional cases, parallel users were observed who were with / around other users but did not communicate and interact with them.

During the observations, it was observed that sub - spaces S2, S6 and S7 were exposed to disturbing effects of the sun; living shadowing elements were too young to fulfil the shadowing function, and there were no non - living shadowing elements. Various activities were observed in the study area including active activities, such as running, playing games, skating and immobile activities like waiting, observing, and reading.

It was observed that peddlers, beggars or fortune tellers were concentrated in S6 and S7 sub - spaces; that other users were exposed to irritating acts of these groups, and that this section was slightly uncontrolled and unsecured.

- ✓ In sub - space 1 (S1), it was observed that the history and the religious identity of the mosque increased the occupancy of the space.
- ✓ In sub - space 2 (S2), it was observed that the users were sitting on benches, on the walls surrounding the space, in the entrance of the municipality building, and at the Clock Tower of historic importance.
- ✓ In sub - space 3 (S3), it was found that the intensive transition activity observed in the space increased the activity in the space. The users were observed to sit on the First Bullet Monument and in the grassy area to the west of the pool located in the space.
- ✓ Sub - space 4 (S4), which was located in the axis that is parallel to the historical Kemeraltı Bazaar, was observed to be used as a transition area. It was found that, in particular, the pool attracted the attention of the children, and that Urban History Park was the most popular and intensively used area.
- ✓ Sub - space 5 (S5) was observed to be used for resting and waiting purposes due to its proximity to the entrance of Kemeraltı Bazaar. It was found that depending on the increase of general occupancy, particularly at noon, user density of the space increased.
- ✓ Sub - space 6 (S6) was found to be located over the main transit axis, and therefore, user activities were intensive in this area.

- ✓ It was found that sub - space 7 (S7) was used for short - term waiting and resting, as it is close to the metro and bus stops and includes fittings such as sitting elements, etc. It was also found that the area was under the effect of noise from the road. It was found that the space was an extraverted space and that the users were able to make easy visual communication with the environment, and therefore, the users felt comfortable.
- ✓ It was found that sub - space 8 (S8) was open to the effects of the climate and offered inadequate sitting elements. The users were observed to sit on the rocks in the shore and on the plastic elements in the space. The fact that the users were able to directly communicate with the sea made this space more attractive, and the plastic element in the form of a keel particularly attracted the attention of children as a playground.
- ✓ The fact that sub - space 9 (S9) had grass surfaces and offers close contact with the sea increased the density of users. Especially at noon, the space was observed to be used for eating and dining.

The data collected after the observations are presented in the Tables 2 - 4. Also the distribution of the users in the area was shown in the Figure 4.

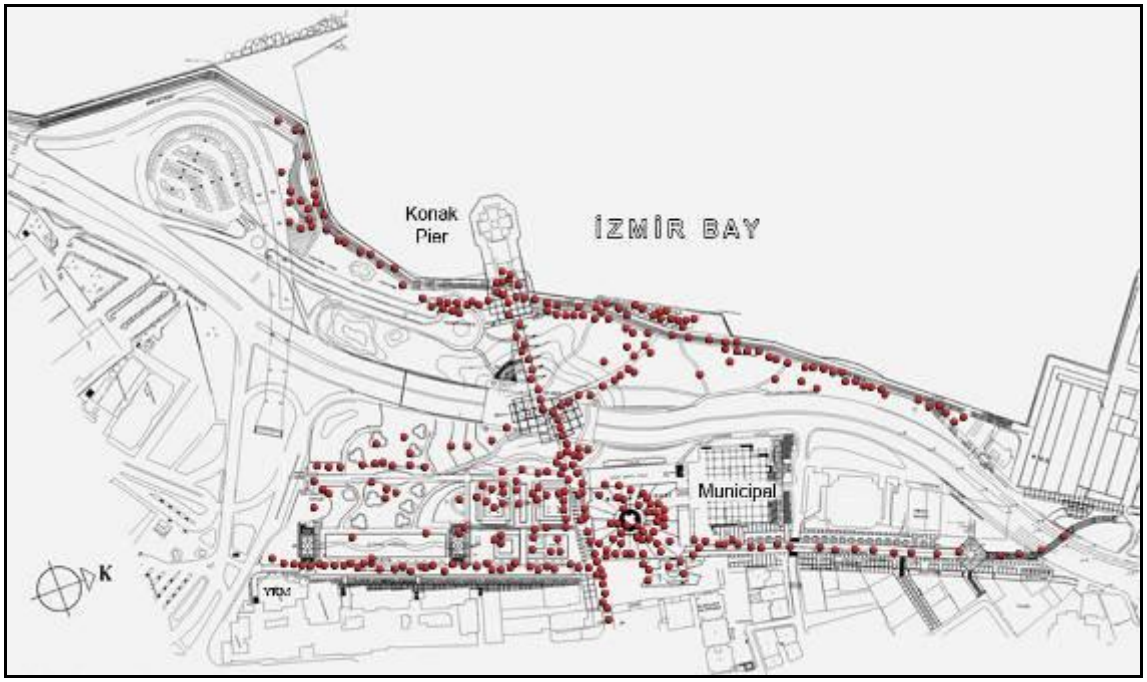

Figure 4. *Distribution of user intensities*

Table 3. Sub - spaces: 1 - 3

S1		S2		S3	
					
Number of Users					
F	**M**	**F**	**M**	**F**	**M**
116	451	669	1190	389	566
Types of Activities					
- Performing an ablution / Performing the salaat - Washing hands / drinking water / filling water - Transiting - Sitting / waiting - Examining the mosque - Taking photographs - Talking - Reading books / newspapers - Speaking on the phone - Eating / drinking - Smoking - Cycling		- Walking / transiting / transiting with a baby carriage - Cycling / motorcycling - Sitting / waiting - Being interested in birds - Taking photographs / recording - Talking - Reading books / newspapers - Speaking on the phone - Eating - drinking - Smoking - Watching / observation - Flying a kite / Playing with a ball		- Walking / transiting / transiting with a baby carriage - Sitting / waiting - Taking photographs / recording - Talking - Watching / observation - Speaking on the phone - Eating - drinking - Smoking - Motorcycling	
Physical Features (Positive)					
- Effect of the mosque on the historical identity, - Importance of the mosque in religious sense, - Presence of water source, - It provides an opportunity for sitting, - It has green fabric		- Importance of the Clock Tower in historical sense, - Presence of birds, - Presence of water source, - It provides an opportunity for sitting, - It provides opportunity for various events, - It can gather different users, - Presence of the board containing the poems and life story of Atilla İLHAN		- Presence of water source in aesthetical sense, - Effect of the First Bullet Monument on the area in historical sense and the fact that the grass areas around the monument create a free sitting opportunity for users	
Physical Features (Negative)					
- The mutual open areas in the eastern and western directions strengthen the use of the space solely with the purpose of transition		- The effect of the sun is very intensive, - Insufficiency of shelters, - Insufficiency of sitting elements, - The floor pavement elements create a problem of reflection, - The negative effect of the transition feature of the square on the other users, - Abundance of peddlers		- The sitting elements restrict the use, - The space is used with the purpose of transition, - Presence of fortune - tellers, - The water sound combines with the noise due to traffic and turns into a more effective noise.	

Table 4. *Sub - spaces: 4 - 6*

S4	S5	S6
		
Number of Users		
F / **M**	**F** / **M**	**F** / **M**
482 / 742	291 / 486	250 / 611
Types of Activities		
- Walking / transiting - Sitting / waiting / knitting - Watching / observation / listening to music - Taking photographs / recording - Talking - Reading books / newspapers / doing a puzzle - Speaking on the phone - Eating - drinking - Smoking - Playing games - Cycling / motorcycling	- Walking / transiting - Sitting / waiting - Observation - Taking photographs / recording - Talking - Reading newspapers - Speaking on the phone - Eating - drinking - Smoking - Playing games - Examining the Map of Izmir	- Walking / transiting / running - Cycling - Sitting / waiting - Taking photographs - Talking - Flying a kite - Sitting / lying / playing games on the grass - Speaking on the phone - Eating - drinking / having a picnic - Smoking - Watching / observation - Taking the dog for a walk - Reading newspapers
Physical Features (Positive)		
- The pool area is the most intensively used section due to the positive effect of the water element in aesthetical sense, - It provides an opportunity for sitting, - Presence of grass areas	- Presence of grass areas, - The mosaic map with a height of 20 cm. provides an opportunity to users for sitting, - The shading level of the trees in the section corresponding to the print of Sarı Kısla creates an attractive effect	- Presence of wide grass areas, - The rocks in the section of grass areas create a free sitting opportunity, - It includes equipment such as sitting elements, garbage, illumination elements and etc., - It is far from environmental effects
Physical Features (Negative)		
- Its intensive use with the purpose of transition due to its parallel location to the Pier – Kemeraltı centerline, - The fact that the sitting elements are covered with a cold material like marble decreases their convenience for sitting	- The section on the eastern direction is used more intensively since it corresponds to the entrance to Kemeraltı, - It is subjected to the effect of the sun, - The level of realizing the urban history map is low, - Insufficiency of sitting elements, - It is solely used with the purpose of transiting	- Presence of fortune-tellers, peddlers and beggars, - Absence of plant / structural elements for shading purposes, - The transition centerline divides the space into two, - The space is insecure and unsupervised

Table 5. *Sub - spaces: 7 - 9*

S7		S8		S9	
					
Number of Users					
F	**M**	**F**	**M**	**F**	**M**
92	124	247	387	271	532
Types of Activities					
- Walking / transiting / running - Sitting / waiting - Talking - Listening to music - Playing games - Speaking on the phone - Eating - drinking - Smoking - Reading newspapers		- Walking / transiting - Sitting / waiting / talking - Taking photographs - Playing a game - with a ball / flying a kite - Speaking on the phone - Eating – drinking / having a picnic - Smoking - Watching / observation - Reading newspapers - books / doing a puzzle - Skating / cycling / motorcycling - Listening to music - Fishing		- Walking / transiting / running - Cycling / motorcycling - Sitting / waiting - Taking photographs - Talking - Fishing - Playing games / flying a kite - Speaking on the phone - Eating - drinking / having a picnic - Smoking - Watching / observation - Reading newspapers - Taking the dog for a walk	
Physical Features (Positive)					
- It provides opportunity for short - term waiting - resting, - Its closeness to the stops of subway and buses, - The green fabric of Bahri Baba Park creates a positive effect in visual sense, - It includes urban equipment, - Its concave structure is strengthened by circular pavement panels, - Presence of sales kiosk		- Positive effect of the sea, - The section, where the ship's keel is located, is distinguished from the transition space by means of pavement difference and it is a focus of interest, - The rocks create a free sitting opportunity, - It includes urban equipment and the sitting elements point to the sea, - Presence of wide grass areas		- The Watching terrace has a difference of height, - Presence of grass areas, - It has a scenery feature	
Physical Features (Negative)					
- Effect of noise on the space, - Negative effect of buildings in visual sense, - Although the number of benches are proportional to the space size, they are unable to meet the demand, - The concentration of peddlers in this section, - The space is open to negative climatic elements		- The space is open to negative climatic effects such as the wind, sun and etc., - Concentration of peddlers and fortune-tellers, - It includes no plant or structural elements with the purpose of shading		- Sometimes the peddlers are concentrated, - It includes no plant or structural elements with the purpose of shading, - The space is open to negative climatic effects such as the wind, sun and etc.	

Findings obtained from environmental measurements
Based on the hourly temperature, humidity, and wind force data collected from Izmir Meteorological Station for the observation days, the area's bioclimatic comfort status was calculated. In the study, it was found that bioclimatic comfort was achieved only in 48.15 % of the observation periods and that in 51.85 % of the periods, bioclimatic comfort was not achieved.

It was found that in 74.07 % of the observation periods, user density in the afternoon was higher than that witnessed in the morning. When the space utilization density during the day was analyzed, it was found that at some observation periods when bioclimatic comfort conditions were not achieved, the space was equally or more densely used when compared to the periods when bioclimatic comfort factors were achieved. Also It was found that S4 and S5 sub - spaces were almost never used in some periods, even when climatic comfort conditions were achieved.

Findings obtained from interviews with designer and implementing firms
Designer and implementing firms were interviewed using pre - formed interview forms.

During the interviews with design firm, it was found that the study area, the symbol of Izmir, which conveyed the traces of history and a continued historical identity, was planned to be designed as a space where the space owns a definition, the future is conserved, the sea can embrace the people, an ever - increasing social functions can be served, people can meet on special days, and users can wander and dream.

The authorized individuals who took responsibility for the design of the Square were elected by local non-governmental organizations and local designers. It was thought that this resulted from the fact that a designer living outside Izmir would not be as familiar with the city as a local designer, so he would not understand the expectations or the needs of the Square.

Also during the interviews with three subcontractor companies, it was learnt that bureaucracy and application costs sometimes restricted these activities. The Konak Square project, which has an area of 204.000 m^2, was realized in 2003 and cost 7.2 trillion TL.

DISCUSSION AND CONCLUSION

The findings of the present study aiming to evaluate a public space were assessed by considering individually the user density, user profile, performed activities and bioclimatic comfort.

The fact that the study area was the square embraces people from every socio - economic level and age group. Because the study area consisted of very important meeting points, the people of Izmir take their guests to the square, and they take walks in the square, the square is bustling; different parts of society simultaneously meet in the square, indicating the achievement of the space. In addition, although in a limited manner, the fact that the space offers the opportunity to meet enhances its performance. However, the meeting of different user groups can sometimes give rise to undesirable situations. In the space, the groups were observed to spend time from 2 hours to 10 hours, and it was found that using of the space was more intensive at the weekend. However, unlike what was expected, it was found that the square was not alive for 24 hours; and neither the design nor management was able to handle this. As for the activities performed in the study area, it was found that the habits and tendencies of Izmir residents impacted the variety of the activities observed in the Square.

When the occupancy aims of the individuals in Konak Square were analysed, it was found that the users mostly used the space for shopping, socio - cultural activities, transition, short - term

resting, meeting, gathering, and eating. Although the intensive transit occupancy first seems to be a negative aspect, it facilitates attracting users to the square and helps to keep users in the space for a longer period of time. The fact that the Square was designed to create a relationship between the land, sea and the green area allows for various outdoor space activities, such as kite flying, fishing, biking, etc. The Urban History Park and the Old Booksellers Street were less intensively used. It was observed that these areas, which allow certain special activities in addition to daily activities, were not used. Sitting elements were sometimes inadequate; however, the design of the space gave the user the opportunity to sit freely. It was observed that some factors such as crowd and noise had a negative impact on some activities, which hindered the enjoyment of the users. Thus, the space failed to be a part of daily life, and it became difficult for the users to feel like they belonged to the space.

When Konak Square was analysed in terms of bioclimatic comfort, it was found that there was no relationship between bioclimatic comfort conditions and user satisfaction, which supported the view that user density is related more to the period of time than the comfort conditions.

Consequently, although the study area is used densely by urban people, some innovations should be performed in order to make the area more charming and cheering, from the landscape architecture perspective. Evaluating the results of this study offers a better understanding of the user, which is important in terms of enhancing the design and thus the performance of the space. The park - square approach, which has a mosaic structure, was effective in the design concept instead. In the design phase, not handling the space in its entirety, and not organizing the divided parts as expected resulted in the area's underperformance. To create a lively and attractive environment for users, some changes must be made.

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