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The effects of water elements in urban space perception: A case study in Üsküdar Municipality Square

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Abstract:
The purpose of this study is to investigate water elements, which are one the most important design elements in urban open spaces, by focusing on their importance in spatial perception, their place in spatial organization, their effects on increasing the quality of space and their psychological effects on users. In the content of the study, the relationships between water elements, urban design and spatial perception processes have been examined in the context of theories of perception and environmental psychology. A questionnaire was conducted to reflect the multi-dimensional aspects to determine how it perceived and interpreted by users with different characteristics and the results of the questionnaire were evaluated for the water element within the case-study area, Üsküdar Municipality Square.

According to the results of the survey and the observations evaluated with Lickert-scale scoring system; four main outcomes have detected: (I) The square and the water element is an important focal point in the whole central area of Üsküdar, (II) The harmony between the water element and the urban environment is interpreted in medium level, (III) Relaxing and refreshing features are more prominent for users, (IV) The design principles are not very successful, the tools used on the pool are common, plain and ordinary (medium level). According to the results and the problems associated with the conceptual framework; the principles to be considered in the design of the water element are produced in the context of the sample area.

Keywords: *Urban open spaces, urban design, spatial perception, water elements, pedestrian areas*

Introduction

Urban open spaces that can be identified as socializing places where the products, information and experiences are exchanged can also become significant focal points of the surrounding urban environment. Regardless of their form and qualities, urban open spaces can be defined as “breathing spaces” where the climatic factors like solar and wind are effective and fresh air circulation takes place and also as the “contact and communication

surfaces" of the social stratums improving the urban quality and making the urban life easier (Kürkçüoğlu, 2009).

Perception and interpretation forms of urban open spaces can vary depending on the physiological and socio-psychological characteristics of individuals. In this respect, depending on the expectations and requirements, appropriation and using patterns of space can also differ (Rapoport, 1991). Beside the individual characteristics and the qualities of urban environment like location and access, elements that define the space have great importance on perception, appropriation and preferability of space.

One of the crucial elements in the process of organization and perception of urban open spaces is "water elements". In addition to its symbolic meaning in terms of the continuity of life water is a very unique element due to its refreshing and soothing qualifications. These attractive qualifications are effective on water to become a *landmark***,** which defined as the elements of a space defining characteristics that are different from their surroundings in terms of scale, location, architectural features, material, and design criteria and easily recognized or discernible from several directions (Lynch, 1960). In addition, water is a design element orienting the actions of users in space balancing climatic comfort, creating positive visual, auditory, and psychological impacts.

Aim and context of the study

The aim of this study is to examine and evaluate the importance of water as a design element that used in urban open spaces in terms of urban space perception and spatial organization, its effectiveness on enhancing the spatial quality and the psychological effects on users.

For this aim to be achieved, the study has been discussed in three stages. **In the first stage;** based on theories of environmental psychology and perception, depending on physiological and socio-cultural characteristics of individuals, the differences in the processes of perception have been addressed in terms of human and urban open space relationship. **In the second stage;** the importance of water element in reference the meaning and symbol value, reasons, forms and design principles for using water element in the design process of urban open spaces have been discussed. **In the last stage,** in the example of the water element of the selected urban open space in Istanbul (Üsküdar Municipality Square) in accordance with the perception process and parameters for the use of water elements; based on the results of surveyed users which have different physiological and socio-psychological characteristics, existing situation, problem detection and suggestions have been evaluated.

Methodology

In the context of the conceptual framework and the selected example, this study has been conducted through domestic and foreign literature search, survey study and detection/observation techniques. The survey consists of three main sections: in the survey, there are questions to examine physiological and demographic structure of the users of this space in the first section, the use of the space in the second section and users are asked for their perceptions of the water element in the third section.

Spatial perception process in terms of human and urban open space relationship

Improving the quality of urban environments in which they are located, urban open spaces are the major focal points where the human actions and socio-cultural activities take place in densely. The use of urban open space and becoming a focal point is directly associated with being perceptible and definable of the space (Lynch, 1960; Erkan, 2002).

Perception, which has been described as the process of obtaining information from the environment basically, is defined as organizing and naming the gained information from the environment in human mind (N.Schulz, 1966). Users experience the space responding to the spatial organizations diversely on the other way round spatial organizations may change in parallel with these responses (Canter, 1977).

User responses and the related spatial perception are in direct proportion to the specific requirements and expectations of the individuals. These requirements and expectations may differ in accordance with the physical, socio-cultural and psychological characteristics and the past spatial experiences of individuals. In this context, different perceptions and responses may occur in the same space (Rapoport, 1991).

Perceptible and definable spaces give users a feeling of security allowing them to learn and dominate the space and to control their movements in the space (Lynch, 1960). Urban open spaces and the spatial elements are perceived and interpreted in different ways passing through the very unique filters of each user. Space and its elements that have been perceived by virtue of the physical signals gained from the environment turn into the images (1) that can be recognized and remembered easily after passing those unique filters (Ivey and Simek-Downing, 1985).

Urban open spaces, which one that the physical qualifications can be distinguished, are remembered more easily with the help of images that has been created in the memory of the users and are used in a more comfortable and functional way. Actions like finding directions, accessing from one point to another, determining the point which one is in and deciding which activities to perform take place with the help of these images that have been created in the memory of the users.

In order to form reference points allied to these images and to form “readable” and “perceptible” urban spaces, as it is quoted by Lynch (1960) *“paths, edges, districts, nodes and landmarks”* that compose the image of the city, have to be apparent to allow the users to perceive the environment more easily. In particular, landmarks and monumental elements affect the quality and the conditions of use of urban open spaces positively but also these can become the image elements which are perceived and stored quickly.

Landmarks are significant urban elements due to the fact that they emerge as reference points helping to find directions and to recognize the space. Due to their physical qualifications, water elements are also one of the important design elements which can make the space a focal point contributing their memorability and can direct/orientate the users easily gaining importance in terms of the urban memory (Kürkçüoğlu, 2009).

Using water element in urban design and perception effects

The importance of water element, the meaning and symbol value – As well as being one of the most important components in terms of ensuring the continuity of life for all living organisms, water can be defined as a culture and a manner of life. Besides its functional qualifications such as its contribution to the development of agriculture and the defensive attribute as threshold and shield and also the use in transportation, water has symbolic values for many communities as being the reflection of heaven, fertility and abundance in the world representing the continuity of life and the sanctity of it (Erdoğan, 2006).

In addition to its symbolic value, water is a very unique element giving a different perception to the size and shape of the space as it is in reality (Rees and May, 2002). Water has an elemental quality which gives it great symbolic meaning when used as a decorative feature. Water together with trees and the canopy of the sky above reminds the wildness of nature (Moughtin and Tiesdell, 1995) can affect the human - environment relationship adding its sounds and pattern to the space as it splashes and gurgles.

The repetitive, flexible and deep nature of the water may create different effects on users depending on the variability of the environmental factors (Pye, 1995).

The reasons of the use of water element in urban design – Since the origin of cities, man has used water not only for essential purposes but also for display (Moughtin and Tiesdell, 1995) and in general, water elements which have different characters are used for two main purposes; "aesthetic" and "functional".

In terms of aesthetic dimension, water elements, which provide psychological, visual, auditory and tactile effects, are primarily perceived by the senses as a "visual element" in urban spaces. However, symbolizing the beginning and the continuity of life it affects human before psychologically rather than visually leading them to itself. Except the directive effect, water elements have also relaxing effects such as visual, acoustic, olfactive and provide concentration with tactile integration on the human (Booth, 1989).

Besides these definitions, water as a non-living thing, due to its color, texture, motion and reflections can lead human to itself as if it is alive. Emotional contact with water occurs when people are allowed to get as close as possible even without actually touching it, resulting *"mental leaning out over"* (Moore and Lidz, 1994). In that way, users can spend their time next to the water element without even touching it.

In terms of functional dimension, water elements provide recreational uses balancing climatic comfort, directing users and controlling the noise of the open space (Zülfikar and Yoshikawa, 2008). Especially in the hot climate regions, water elements create natural air-conditioning effect balancing and regulating the air temperature (Booth, 1989; Harris and Dines, 1988).

On the other hand, especially in the urban areas where the density is high, the mass of noise that caused by vehicles, people and industry, can be isolated or minimized using water elements and its acoustic qualification. Besides, water elements provide also recreational uses like observing,

analyzing the wildlife and resting in the space which they are located in (Booth, 1989; Harris and Dines, 1988).

In terms of aesthetical, functional and ecological / sustainable approaches, water elements have made a significant contribution to the development and reformation of "**water culture"** and the creation of synergies with other urban functions and also to the rebalancing process of the ecosystem. Considering water as a resource value for planning at macro level and integrating the natural and the artificial water resources together, the production and organization of sustainable and aesthetically pleasing outdoor spaces can be achieved (Perysinaki, 2010; Erdoğan, 2006).

However, the acceleration of the process of urban growth cause the damage of the existing water infrastructure systems which shape the urban forms, provide the ecological objectives and create a network of open spaces to satisfying the social needs.

Using types of water elements in urban design – The role of the water in urban open spaces as a design element is directly affected by the movement of the water (Booth, 1989). The still surface of water has calming, relaxing and soothing effects. In this context, the elements of *still water* (ponds and small lakes); besides ensuring reflector, window, texture and activator effects (Table 1) due to its visual and reflective features, these elements also provide opportunities for uninterrupted thinking (concentration) and for balanced microclimate creating coolness and moisture (Booth, 1989; Harris and Dines, 1988). Appealing to all the senses including the visual, auditory and psychological ones, *moving water* elements *(flowing / falling water, jets and fountains)* can create strong effects of movement such as excitement or peace and tranquility and beyond this, there are also refreshment, entertainment and pleasure, prestige / spectacle, urban oasis, commemoration, metaphor and information effects (Symmes, 1991) (Table 2).

Table 1. *The environmental effects of still (contained) water elements (developed from Erdal, 2003: 63).*

Effect	*Depth*	*Inner Surface Color*	*Water Surface*	*Visuality*	*Sound Level*	*Perceptual Effect / Function*	*Design Objective in Urban Open Spaces*
Reflector	*Deep*	*Dark*	*Plain*	*Good*	*-*	*Perception of depth & size, concentration, mental renewal*	*Emphasis on elements, Spatial Perception Enrichment*
Window	*Shallow*	*Light*	*Plain*	*Average*	*-*	*Concentration*	*Presentation & Exhibition*
Texture	*Deep*	*Dark*	*Rough*	*Good*	*Low*	*Focal point, Recognizability*	*Bringing the water element forward in space*
Activator	*Shallow*	*Light*	*Rough*	*Average*	*Low*	*Dynamism & Briskness*	*Adding life, spirit and briskness to the space*

Table 2. *The environmental effects of moving (uncontained) water elements (developed from Symmes, 1991 and Erdal, 2003: 78-89).*

Effect	Visuality	Sound Level	Water Flow Velocity / Intensity	Splashing	Perceptual Effect / Function	Design Objective in Urban Open Spaces
Refreshment	Good	Average	Average / High	High	Climatic Comfort Relaxation / Relief	Balance of Microclimate, Spatial Comfort
Entertainment & Pleasure	Good	High	Average / High	High	Excitement, Dynamism and Pleasure	Attracting the users, Concentration, Providing the contact with water
Prestige& Spectacle	Very Good	High	High	High	Glory, Admiration and Dynamism	Showing the power, Affecting the user, Orientation
Urban Oases	Good	Average / High	Average / High	Average	Relaxation, Breathing, Having a Rest	Improving the Spatial Quality, Attracting the users
Commemoration	Very Good	Average / High	High	High	Memorability, Commenting, Admiration	Expressiveness, reminding the history, attractiveness
Metaphor	Very Good	High	High	High	Thinking, Commenting, Meaning Attribution	Making users think, comment and imagine through symbols
Information	Good	Average	Average	Average	Being Informed, Orientation	Giving information about time and date

Design principles of water elements – Based on the expected environmental, and psychological effects of water elements on the users; design principles vary depending on *the duration of use* and *the quality of space* (pedestrian and vehicle spaces).

When the pedestrian spaces have a maximum duration of use, *visual, auditory, psychological effect, climatic comfort and noise shielding* principles come to the fore in the design process of the water elements. On the other hand, when the duration of use is a minimum as in vehicle spaces, water elements, which are not distracting aurally and visually, are used to enhance only the visual quality not to disturb the attention of users while driving (Erdal, 2003).

Water elements have been organised to form a major focal point and to be perceived from more than one point in pedestrian spaces. In general, water elements are located at the center of the space or very close to the center considering the visual and spatial continuity in terms of not to block the view of the users. Spanning over the space geometric or free-formed water elements may cause the users not to observe the space as a whole. In this respect, in order to make the users complete the mental image of the space, repetition / rhythm and continuity principles of design are applied (Brookes, 1991). In urban open spaces, water elements are organized in forms such as point, line, pool and edge and these forms allow activities and effects like coming together, watching, recreation, relaxation, bordering and orientation (Table 3).

Table 3. *The change of the spatial identity allied with the character of the water (developed from Şengül, 1995: 57).*

CHARACTER	ACTION	ACTIVITY and PERCEPTION EFFECT	EXAMPLE
Point	Splashing water from one point	Meeting and watching/observing	water jets
Line	Flowing water along a line	Controlling and bordering, identification and orienting	canals and streams
Pool	Water filling	Meeting and watching/observing, resting, spending leisure time	ponds
Edge	Border - Threshold	Meeting and watching/observing, resting, spending leisure time	pools and coasts

In brief, the use of water elements in urban open spaces;

- increases the quality and comfort of the space,
- shapes the spatial organization and urban pattern,
- forms a focal point that can be perceived and observed by the users,
- has many qualifications in terms of aesthetic dimension; psychological, visual, auditory and in terms of functional dimension; balancing the climatic comfort, shielding the noise, orienting,
- and contributes to the production of sustainable urban space and ecosystem.

Analyzing the effect of the water element on the spatial perception in Üsküdar Municipality Square

Üsküdar Municipality Square and water element

Üsküdar has been an important religious and commercial center and a transfer point in terms of its service areas and transportation systems (road and sea) in Istanbul Metropolitan Area. Besides, the completion of the construction of Marmaray and Metro railway hub projects will increase the importance of the district on the movement of vehicles and pedestrians (2).

The relationship between coast and the inner center of the Üsküdar district as a coastal settlement on the Bosphorus has been damaged due to the Marmaray project excavations, public transport system and the coastal road traffic and therefore the sensual/psychological relationship between users and sea has been weakened considerably. Therefore, users satisfy their needs for urban open spaces in public service areas (in courtyards of Mihrimah Sultan and Valide Sultan Mosques) and in the central focal points.

As one of the very rare urban open spaces in the central area of Üsküdar; gaining its identity with the local government unit, Üsküdar Municipality Square is a important focal point which links the coastal, central and residential areas to each other and fronts to the first degree transportation artery (Hâkimiyet-i Milliye Avenue / National Sovereignty Avenue) connecting other centers with Üsküdar (Figure 1). In particular, the heavy pedestrian use during weekdays causes this square to become a *dense and living / dynamic* space.

In terms of the effects of religious structures on the spatial identity of Üsküdar settlement; water elements have been organized in reference with these religious structures from past to present. The Fountain of Sultan Ahmed III in front of the Mihrimah Sultan Mosque and the ablution fountain in Valide Sultan Mosque and Külliye are one of the oldest examples of water elements in the central Üsküdar (Figure 2).

The geometric-shaped pool in the Municipality Square, which is the subject of this study, has a metal sprinkler system spouting water to more than one direction and it is constructed using light blue colored ceramic for the inner surface and gray colored concrete slabs for the outer surface (Figure 3).

Visually, sprinkler and water create a sculptural appearance as a whole and the fixed speed and amount of the splashing water serve as a shield that covers the noise sources around in the space aurally. Also this water element leaves cooling effect on the users refreshing the air in the space. The movement of water provides dynamism as well as attracting the attention of children. The location of the water element at the centre of the square and the location of sitting elements around it give users more opportunities to focus on the water.

In spite of the character of the square as a transitional space, the organization of the water element and the sitting elements increase the duration of the use of the square. Besides, due to the fact that each individual has different physiological, psychological and socio-cultural characteristics, the degree of the perception, and the interpretation of the water element by the users of the space vary from person to person.

Figure 3. *The water element in Üsküdar Municipality Square (E. Kürkçüoğlu, 2009).*

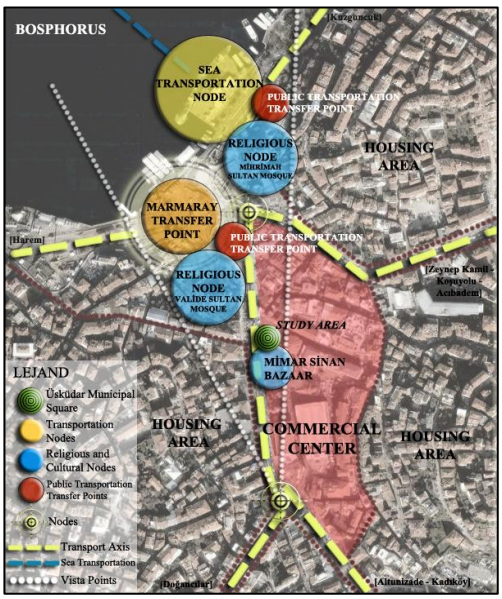

Figure 1. *Environmental relationships and the location of the Üsküdar Municipality Square (schematized on Google Earth map).*

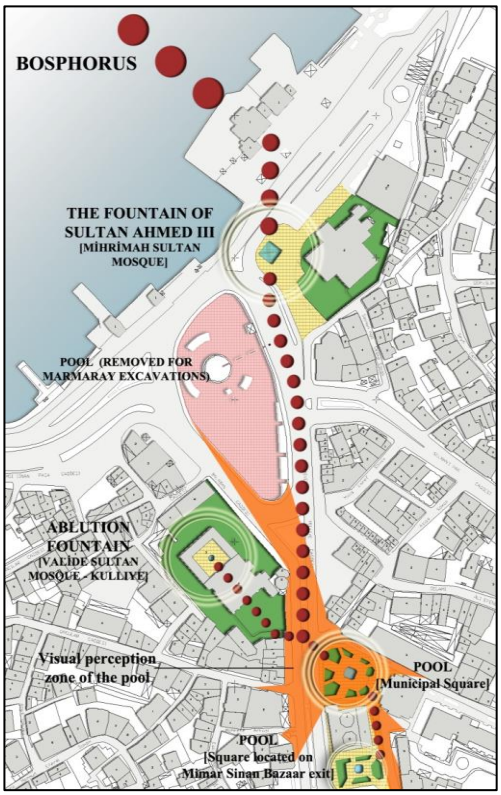

Figure 2. *The relationships of water elements with each other in the central Üsküdar (schematized on base map).*

In order to measure how the water element has been perceived by different user groups; the effects of the socio-psychological characteristics of the users on their perception of the space and the water element and also their expectations from water elements have been tested through a questionnaire-based survey that consists of 23 questions and the results have been interpreted, supporting them with observations and findings. Considering that the Üsküdar Municipality Square and water element allow different uses during different days of the week; a survey study was conducted with 50 users from various groups on different days and hours (weekdays 50% - weekend 50%).

Result findings on demographical structure

Analyzing the age groups of the users, the distribution of their professions and the neighborhoods that they live in; it has been found by using systematic random sampling technique that the gender ratio of the users is 54% female and 46% male and also the frequency of use is 44% for the age of 16 to 30 years and 34% for the age of 31 to 45 years in total.

In this context, it has been precipitated that this space has been less preferred by the other age groups because of *the effects of the pedestrian density and the vehicle traffic noise which are due to the central location of the square that surrounded by the commercial and service units.*

According to the profession distribution, it has been confirmed that the 50% of the users are employed (mainly in the private sector) and the other 50% of them are unemployed including housewives and students mostly. The variation in these rates show that this space has a character that can be used different kinds of user profiles. In other words, *this space is not just a stopping point in the everyday life it also has the characteristics of a recreational area that visited consciously for some users*.

Analyzing the neighborhoods which the users live in it has been observed that 76% of the respondents live on the Anatolian side (mostly in Üsküdar) and the rest 24 % live on the European side. As a result of the interviews with the users, it has been also observed that people who live on the European side use that space for shopping and relative visiting purposes.

Result findings on spatial use

In this section, the frequency and the time period of the use (days and hours), the purposes of the users, also the routes and transportation systems that they have used to reach that space have been questioned. According to the frequency of visits, it has been revealed that people use the space everyday (20%) and once a week (18%) in other words often with a total of 38% but the rest 62% use it rarely. This situation proves that the character of the space has not a defined visiting schedule in the everyday life. People use the space on weekdays (58%) and weekend (42%). The central feature of the space and the density of commercial and service units are directly related with the rate of this weekdays use. Also, being visited of the space mostly during the hours between 14:00-18:00 (%58) and between 12:00-14:00 (24%) has been associated with the central location of the space, the end of the lunch hour and office hours and the decrease of the harmful effects of the sun's rays. The closing hours of the public units (municipality) and the business units when the fountain is not running causes a decrease in the user density after 20:00 in terms of security

concerns (Figure 4). Another result of this survey study is that users reach that space using public road transportation (50%) and by walking (30%).

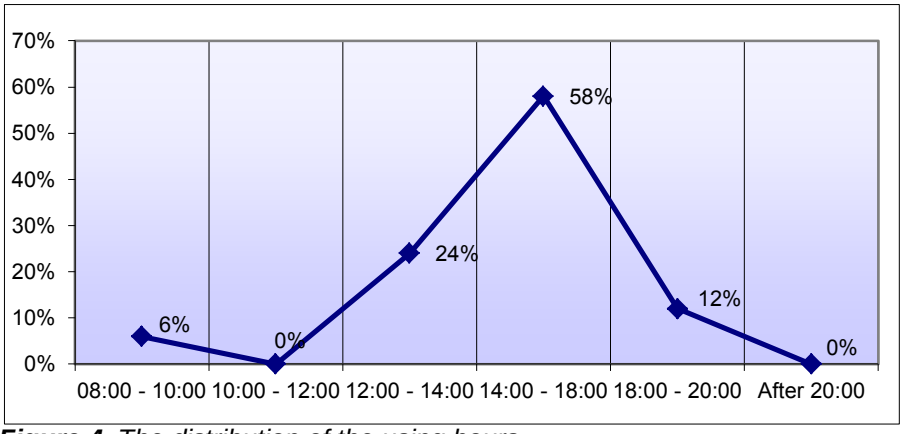

Figure 4. *The distribution of the using hours.*

The rate of the users that come to this space to especially use the square by walking is 54% including mainly retirees, housewives and employees working near.

Questioning the purposes of the use; it has been found that people use that space for recreational purpose mainly (30%) (Figure 5). In this respect, it can be said that this space is *a stopping point serving for the recreational purposes and also a major node that users pass through or spend their time.* The reason of why the other purposes are preferred less is related with the issues such as *the surrounding built environment, the limited green areas and the great density of pedestrians.*

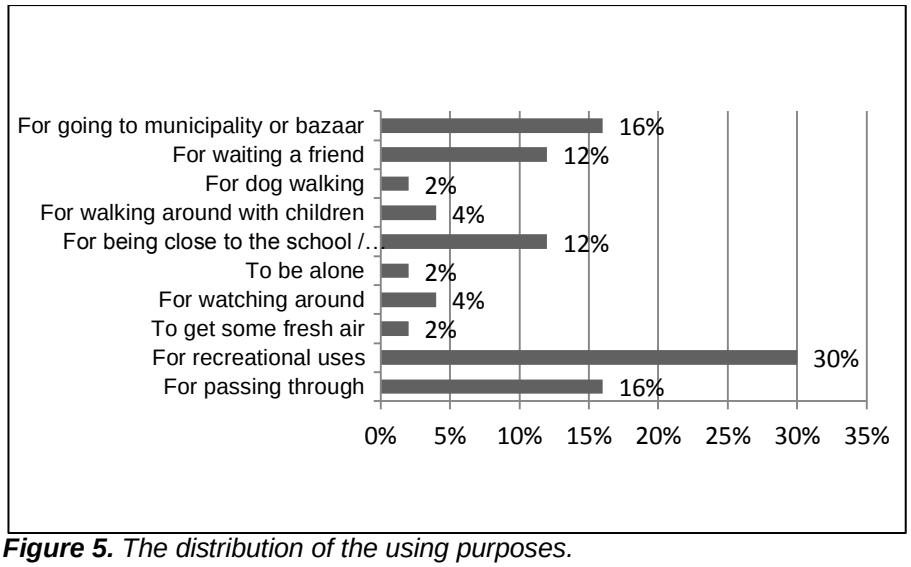

Figure 5. *The distribution of the using purposes.*

Result findings on water element

Seven anonymous (3) parameterized (4) adjective pairs (5) were created under the headings which are specified as aesthetical and functional in order to examine the reasons of the use of the water element and also under the specified headings as form, color and texture to examine the design principles (Figure 6). In addition, the harmony of the water element with the

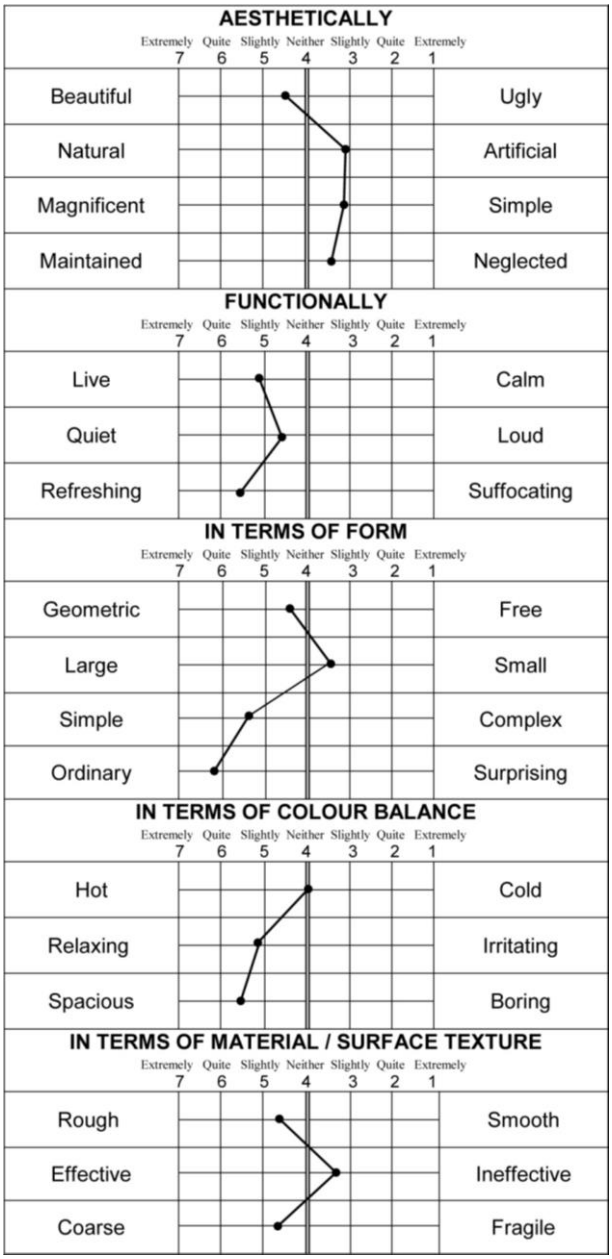

Figure 6. *The evaluation of the water element in terms of aesthetic, function, form/shape, color and material by the users.*

space (in terms of form, color, texture, and scale) and the degree of the focal point qualification were scored along a five-point continuum Likert scale (6).

Aesthetically, water element has been described as beautiful due to the fact that it is interesting and dynamic but on the other hand it has been also described as less beautiful (4.68) and neglected (3.56) because it is an ordinary water element that gets dirty very quickly and not overhauled regularly (Figure 6).

Functionally, the refreshing effect (5.10) and the cooling effect (5.66) of the water element on its users have seen as very important. (Figure 6) Besides, shielding the surrounding noise, the sound of the water has been considered quite positively.

In terms of form, the geometry (4.42) and the size (3.64) of the water element have not been extremely perceived. Due to the fact that it can be observed with all details at the first glance, this conventional formed water element has been also described as simple (Figure 6).

Also in terms of hot and cold color balance, light blue colored inner surface, grey colored borders and the entire metal color of the fountain (4.02) have been perceived as ordinary (Figure 6). Some of the users have indicated that the light blue color has a relaxing effect but the others have found this color very usual preferring more interesting colors or textures.

The material / surface texture of the water element has been perceived as (poor) rough (4.80), (poor) ineffective (3.40) and (poor) coarse by the users (Figure 6). In this regard, it has been determined that users focus on the movement of the water and its color rather than its material.

Based on these parameters, the harmony of the water element within the urban environment (in terms of form, color, texture and scale); has been evaluated as “average” as in the results of each design principles separately (Figure 7). Questioning the degree of focal point quality and the degree of how much this water element reminds the space; the focal point effect has been observed as “almost strong”. This result is directly related to the central

location and the exceptionality of the water element in the surrounding urban environment and its proximity to the main pedestrian and vehicular arteries (Figure 7).

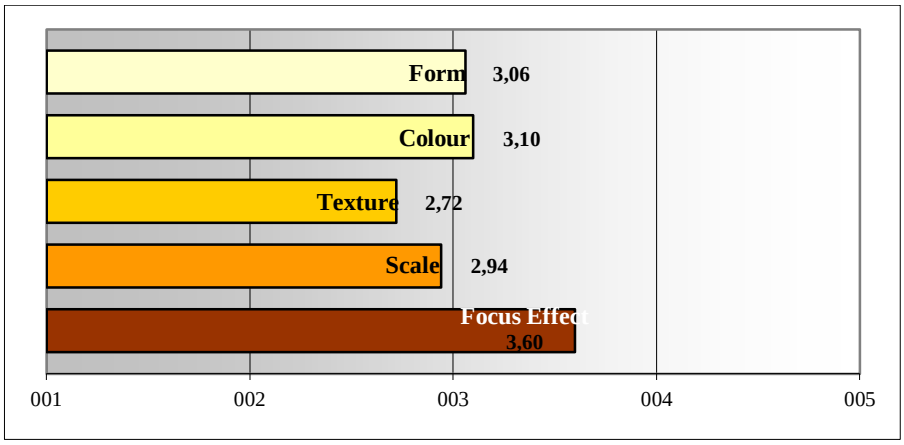

Figure 7. *The degree of the harmony and the focal point quality of the water element within the surrounding urban environment.*
(1:Very Poor, 2:Poor, 3:Average, 4:Strong, 5:Very Strong)

Conclusion

As a result of the evaluation of the water element in Üsküdar Municipality Square, based on the parameters which has been defined as; the importance of water element in urban open spaces, its effect on the process of spatial perception and design principles, following findings have been obtained;

Implications on the use of the water element in urban open spaces

- Water elements are significant design elements which improve the spatial quality responding the needs of human in terms of aesthetical, functional and psychological aspects. Also in terms of visual and auditory aspects they can balance the climatic comfort, shield the noise and become focal points in the space.

- Water elements turn into the images that can be recognized and remembered easily and gain importance in terms of the urban memory. Spatial perception may vary depending on the form, size, movement, waving and splashing, color, brightness and reflectivity qualifications of water elements. Depending on these qualifications, these elements may create effects on users like composure, tranquility, refreshment, concentration, enthusiasm, dynamism and excitement. In terms of aesthetic and functional dimension, beside its reflective, expositive, distinctive, exhilarative, renovating, refreshing, entertaining and relaxing qualifications water elements have also informative qualifications such as prestige / spectacle, urban oases, commemoration and metaphor. All these effects and qualifications play an important role in the process of perception.

- Water elements have to be designed with an approach that integrates the space harmoniously. The water elements which are on the nodes have to be designed as **"orienting the organization of space"** aesthetical and functional solutions have to be produced according to the preferences of the users.

Spatial implications on Üsküdar Municipality Square and Water Elements

• Üsküdar has been an important traditional center and transfer point shaped by commercial, administrative and religious functions with high pedestrian and vehicle density. In terms of transportation, there is a lack of integration with the coast due to its critical transfer point quality; depending on the inefficient use of coastline there is an unsatisfied need for the use of urban open spaces. Municipality Square has become an important focal point with a high level of accessibility as being one of the very rare urban open spaces in the central area and also as being the intersection point of canal spaces and pedestrian flow due to its functional meeting point quality. Because of its identity that has been shaped by the functions of everyday life, it is frequently used especially on weekdays and after noon hours.

• The water element is located at the centre of the space to be perceived from different directions (Figure 2). *Functional qualifications* of the water element come to the fore compared to the aesthetic qualifications. According to the results of the survey, considering its central location which is close to the main transportation artery, noise shielding that caused by the vehicles and crowd, refreshing and exhilarating effects and its breathing space quality in a very dense urban pattern have been interpreted as the most satisfying qualifications of the water element by the users. Furthermore, it has been observed that it is used as a reference point for spatial orientation due to its perceptibility from many points; however, this water element has no directing effect towards the coast, on the contrary, it has a gathering effect as a meeting point.

• According to the results of the survey study the degree of the harmony with the environment depending on the aesthetic qualifications is at an average level. In terms of form, this water element has been perceived as simple, ordinary and middle sized, and also in terms of color has been perceived as relaxing and spacious. Yet, material qualifications do not attract attention or are not perceived. On the other hand, this water element has been perceived by its users as a focal point due to the absence of other public open spaces becoming a landmark in their perception.

• According to the users, the most dissatisfying matters are when the water element is neglected and the sprinkler system is stopped by the municipality and also when the children get into the pool.

Solution suggestions to define the design principles of the water element and site selection in terms of the identity and the image of Üsküdar Settlement

• Water elements have to be design in the context of a spatial organization that directs the users towards the sea as a natural water element considering them as a macro-scale planning factor in Üsküdar which is a coastal settlement. Within the framework of this spatial organization, principles such as creating breathing spaces, integration with the surrounding functions and contribution to the continuity and ecological sustainability must be considered.

• Water elements should not compete with the symbol structures of the urban pattern (Mihrimah Sultan and Valide Sultan Mosques, the fountain of Sultan Ahmed III, Mimar Sinan Bazaar etc.) and should refer to the historical

environment (especially through the choice of material and color) besides its orienting effect. In the terms of design, spatial and visual relation and continuity should be organized with the historical water elements like the ablution fountain in Valide Sultan Mosque and the fountain of Sultan Ahmed III, which have an important role in the identity of Üsküdar.

- In the spatial organization process of the water elements in central Üsküdar, design approaches that allow perception from different directions, in harmony with surrounding environment and also with high functional, aesthetic and ecological effects must be implemented.

- In the central Üsküdar where the pedestrian and vehicle traffic is dense moving water elements, which do not annoy users in terms of sound, must be focused on in order to shield the noise and the pollution that generated by the crowd.

- Designs that integrated with the natural landscape and lighting elements should be offered taking the preferences of the users into consideration. The maintenance and security of water elements should be provided and controlled periodically. The spatial quality and identity must be considered for the site selection for technical equipment.

Urban open spaces which have been defined as the centers of socialization and breathing spaces within the dense urban pattern should be organized to increase its liveability and preferability using elements like water that enrich the spatial perception and quality; turning them into unique spaces to remember and perceive.

Footnotes

(1) *In order to create images of urban open spaces and to use these images, some of the human senses such as **seeing (60%)** and **hearing (30%)** come to the fore more than other senses **(touch and smell, 10%)** (Hall, 1966). Human can perceive elements of the space within the limits of detection of the eye immediately and the remaining parts can be perceived by spatial experiences and other senses or mental completion method (Gehl, 1987).*

(2) *On the other hand, Central Region Urban Design Project which has been brought to the agenda with the construction works of Marmaray project that creates a focal point in Üsküdar (IMM, 2009), constitutes important opportunities to look for spatial solutions in the space which integrate the waterfront, pedestrian privileged relating the transfer points and squares to each other, reference to the religious buildings and their identity.*

(3) *The lowest grade that has been given to the negative adjectives (-3) 1 point, the highest grade for the positive adjectives (3) 7 points and the abstaining / neutral rating (0) has been graded as the 4 points.*

(4) *3 (extremely), 2 (quite), 1 (slightly), 0 (neither), -1 (slightly), -2 (quite), - 3 (extremely).*

(5) *Adjective pairs are lined up as in terms of aesthetic dimension; beautiful-ugly, natural-artificial, magnificent-simple, maintained-neglected, in terms of functional dimension; live - calm, quiet -loud, refreshing - suffocating, in terms of form; geometric - free, large - small, simple-complex, ordinary - surprising, in terms of color; hot - cold, relaxing - irritating, spacious - boring and in terms of material texture; rough - smooth, effective - ineffective, fragile - coarse.*

(6) ***Likert Scale:** It is the most widely used approach to scale responses in survey research, measuring level of agreement or disagreement of the individuals on a symmetric agree-disagree scale for a series of statements scoring them along a range (usually five or more).*

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Su elemanlarının kentsel mekân algısına etkisi: Üsküdar Belediye Meydanı örneği

Kentsel açık mekânların, hangi biçim ve niteliklere sahip olursa olsun, kentsel yaşamı kolaylaştırdığı ve kentsel kaliteyi artırdığı tartışılmazdır. Kentsel açık mekânlar; yoğun kent dokusu içinde güneş, rüzgar gibi iklimsel koşulların en etkili olduğu ve temiz hava dolaşımının en çok gerçekleştiği alanlar olmakla birlikte, yoğun kent yaşamının olumsuzluklarından soyutlanmış, içinde bulunan doğal öğeler sayesinde kullanıcılar üzerinde olumlu psikolojik etkiler bırakan "nefes alma boşlukları olarak tanımlanmaktadır.

Kentsel açık alan düzenlemesinde yer alan ve mekânsal algı süreçlerinde önemli bir yere sahip olan unsurlardan biri "su elemanları"dır. Su; insan yaşamı açısından sembolik bir anlama sahip olmasının yanı sıra ferahlatıcı ve akustik özellikleri sayesinde kullanıcıları kendine çeken doğal bir öğedir. Bu bağlamda kentsel açık mekânlarda su elemanı kullanımı; mekân kalitesi, konforu ve yaşanabilirliğini doğrudan etkilemektedir. Suyun çekici özellikleri ve içinde bulunduğu çevrede ön planda yer almasından ötürü su elemanları, kentsel mekânlar içinde önemli işaret öğesi görevi üstlenmekte ve bulunduğu mekânı odak noktası haline getirebilmektedir. Bununla birlikte su elemanları; mekânsal organizasyonu biçimlendirmek, mikroklimayı dengelemek ve gürültü kontrolü sağlamak gibi işlevsel etkilerinin yanı sıra, kullanıcılar üzerinde görsel, işitsel, temassal ve psikolojik etkiler oluşturabilen, aynı zamanda algı sürecinde hızlı bir biçimde depolanabilen ve imge unsuru haline gelebilen ayrıcalıklı bir tasarım öğesidir. Her bireyin su elemanlarını algılama ve yorumlama biçimleri, fizyolojik ve sosyo-kültürel özelliklere bağlı algı süreçleri doğrultusunda farklılık göstermektedir. Su elemanlarının kullanıcılar üzerinde oluşturduğu farklı görsel, işitsel ve psikolojik etkiler doğrultusunda, içinde bulunduğu mekân konforuyla birlikte kullanım yoğunluğunu da arttırmaktadır; içinde su elemanı bulunan mekânlar kullanıcılar tarafından daha çok tercih edilmektedir.

Bu çalışmanın amacı; kentsel açık mekânlarda yer alan önemli tasarım öğelerinden biri olan su elemanlarının mekânsal algı açısından önemini, mekân organizasyonundaki yerini, mekân kalitesini arttırmaktaki etkisini ve mekânı kullanan bireyler üzerinde bıraktığı psikolojik etkileri irdelemektir. Çalışma kapsamında algı ve çevre psikolojisi kuramları bağlamında, mekânsal algı ve su elemanlarının kentsel tasarım süreci içindeki yeri incelenmiştir. Çalışma sınırları dâhilinde, kentsel karaktere bağlı belli büyüklük, biçim ve konum özelliklerine bağlı olarak büyük ölçekli yeşil alanlarda yer alan su elemanları ile deniz, akarsu, göl gibi doğal su elemanları çalışma kapsamı dışında tutulmuş; meydanlar, yaya mekânları ve küçük ölçekli yeşil peyzaj düzenlemelerinde yer alan yapay su elemanları incelenmiştir.

Toplam üç aşamada ele alınan çalışmanın birinci aşamasında; çevre psikolojisi ve algılama kuramlarından hareket ile bireylerin fizyolojik ve sosyo-kültürel özelliklerine

bağlı olarak, algılama süreçlerindeki farklılıklar, insan ve kentsel açık mekân ilişkisi kapsamında ele alınmıştır. İkinci aşamada; suyun önemi, anlam ve simge değerlerine değinilerek, kentsel açık mekânlarda su elemanı kullanma nedenleri, biçimleri ve tasarım ilkeleri tartışılmıştır. Son aşamada ise İstanbul içinde seçilmiş bir kentsel açık mekânda (Üsküdar Belediye Meydanı) yer alan su elemanına yönelik olarak; algı süreçleri ve su elemanlarının kullanımına yönelik parametreler doğrultusunda; farklı fizyolojik ve sosyo-psikolojik özelliklere sahip kullanıcılarla yapılmış anketlerin sonuçları üzerinden, sonuç bulgulama, sorun saptama ve öneriler geliştirme değerlendirmeleri yapılmıştır.

Üsküdar Belediye Meydanı kentsel açık mekân örneğinde yer alan su elemanının, kullanıcılar tarafından nasıl algılandığı ve yorumlandığını tespit etmek üzere çok parametreli bir anket çalışması yapılmış ve sonuçlar değerlendirilmiştir. Üsküdar Belediye Meydanı ve meydanda yer alan su elemanı; yoğun ve karmaşık bir kentsel doku içinde yer alması, kendisini çevreleyen doku içinden biçim, renk, malzeme gibi özellikleri ile ön plana çıkması ve bu doğrultuda, mekânsal algı sürecinde bir imgeye dönüşebilmesi nedeniyle tercih edilmiştir. Meydanda yer alan fıskiyeli havuz, çeşitli çevresel etkiler ile kullanıcıları kendine çekmekte ve mekân içinde odak noktası oluşturmaktadır. Ayrıca Üsküdar'ın mevcut dönüşüm sürecine bağlı olarak deniz kıyısı ile ilişkilerinin zayıflaması, kentsel doku içinde nefes alma boşluklarının azalması göz önüne alındığında, meydanın kullanıcılar için sadece bir geçiş noktası değil, aynı zamanda bir duraklama noktası olmasına da katkı sağlamaktadır.

Yapılan anket ve gözlem çalışmalarının Likert Skalası tekniği ile değerlendirilmesi sonucunda, su elemanı ve içinde bulunduğu meydanın; Üsküdar merkez alanı bütünü içinde önemli bir odak noktası olduğu, ait olduğu kentsel çevreye uygunluğunun orta seviyede olduğu, su elemanının kullanıcılar açısından özellikle dinlendirici ve serinletici etkilerinin ön plana çıktığı, ancak tasarım ilkeleri açısından çok başarılı olmadığı (orta seviye) yönünde yorumlandığı bulgularına ulaşılmıştır. Sonuç bulgular ve sorun tespitlerinin kavramsal çerçeve ile de ilişkisi kurularak; kentsel açık alanda su elemanın tasarım ilkeleri açısından göz önünde bulundurulması gereken ilkeler, örnek alan bağlamında üretilmiştir.