

Evaluation of a Pedestrian Zone from a Functional Perspective: The Case of Izzet Baysal Street

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Abstract Pedestrian zones are urban spaces that include recreate activities such as resting, cycling, walking, shopping. People have a constant communication and interaction in these areas. In this study, Izzet Baysal Pedestrian Zone has been examined from a functional perspective. The aim of this study is to determine the quality of the functions of the Izzet Baysal Street which is a pedestrian zone. For this purpose an questionnaire was prepared including the functions of both an ordinary pedestrian zone and Izzet Baysal Street was prepared. This questionnaires has been enforced to the users of the area and the results were compared. As a result the qualification level of the flooring, water usage, lighting, resting, garbage collection, shadow, plant material, drainage and public transport proximity-car parking that existing Izzet Baysal Pedestrian Zone are lower than an ordinary pedestrian zone qualification levels. The qualification level of barrier free design function was found similar degree with the expected rates.

Keywords Pedestrian zone, function, public space, landscape, design

1. Introduction

The pedestrian zone is a road or a space created as a pedestrian circulation and a shopping center route, which opens to pedestrian traffic in order to reduce the complexity of intensive motor vehicle and pedestrian traffic in cities [1].

According to the pedestrian rights declaration, the city centers are pedestrian areas and the real owner of the urban life is the pedestrians. Therefore; As it contributes to urban culture by increasing people-to-people communication, it is supported and encouraged. Pedestrians, together with local administrations, develop an organization that can defend their rights of propagation and communicate their complaints. Traffic decisions and police also protect and protect the rights of pedestrians. Local authorities maintain the pedestrian infrastructure, day and night, clean and bright, to be repaired, to provide visual appeal to plants and trees, with the contribution of pedestrians, local administrations. Pedestrians have the right to participate in making decisions about sidewalks, pedestrian areas, pedestrian paths and pedestrian crossings. Every urban citizen has these rights for a civilized, livable, human, healthy place [2].

According to Yaslica (1991), in urban arrangements, users are often asked about their plans after planning. The success level of the design will increase with the evaluation of the behaviors and requests of the users before the planning [3].

Planning of pedestrian zones requires a combination of many professional disciplines. The first thing to consider in the regulation of pedestrian zones is the selection of the appropriate place. In the choice of location, priority is given to urban sites that have historical significance, especially with secondary roads between residential areas where there is no transit and high traffic, or shopping areas in the city center where the pedestrian density is high [4]. According to Project for Public Spaces (PPS), the walking strip on the pedestrian walkway should be at least 2.50 m, and 4 persons could easily pass side by side. [5].



The main reason for the creation of pedestrian zones is the reconsideration and evaluation of urban spaces for human comfort [2].

The first studies on the subject in Turkey was started by ITU Faculty of Architecture, Urbanism department students. In the years 1963-1964, it was planned to allocate the vehicle road and its close surroundings to the pedestrian transportation between Galatasaray and Taksim settlements, in Istanbul [6].

The Netherlands and Germany have pioneered the arrangements for pedestrian zones. The first pedestrian zone was built in 1926 in Essen, Germany [7]. These works aim to preserve the historical character, to keep the places that were crushed under the motor vehicle traffic throughout the day and to leave the places left at night. This issue has begun to attract interest in Turkey after 1970, it has been implemented for the first time with pedestrianization work initiated by the Municipality of Ankara in 1978. Especially in the cities such as Istanbul, Bursa and Izmir, the places such as the Grand Bazaar and Kemeraltı, which have a shopping center feature, have long been used as a pedestrian zone both socially and economically [8].

In this study, Izzet Baysal Pedestrian Zone that is located in Bolu, In Turkey was evaluated in terms of the functional features it had. This evaluation was performed by comparing the same functions with the general pedestrian zones. For this purpose a questionnaire was prepared in relation with the functions which should be owned by a pedestrian zone in general and the functions owned by the Izzet Baysal Pedestrian Zone, the prepared questionnaire was applied to the users of the area and the results were compared. Another issue which was intended to be achieved with this study was the development of the suggestions for a more functional use.

2. Materials and Methods

The city of Bolu is located in Turkey's western Black Sea region. It is bordered to the west by the Sakarya and Duzce, to the southeast by Bilecik and Eskisehir, to the south by Ankara, to the east by Cankiri and Karabuk and to the north by Zonguldak. The altitude of the city center is around 725 meters. In Figure 1 Bolu's districts and its location was given within the borders of Turkey.

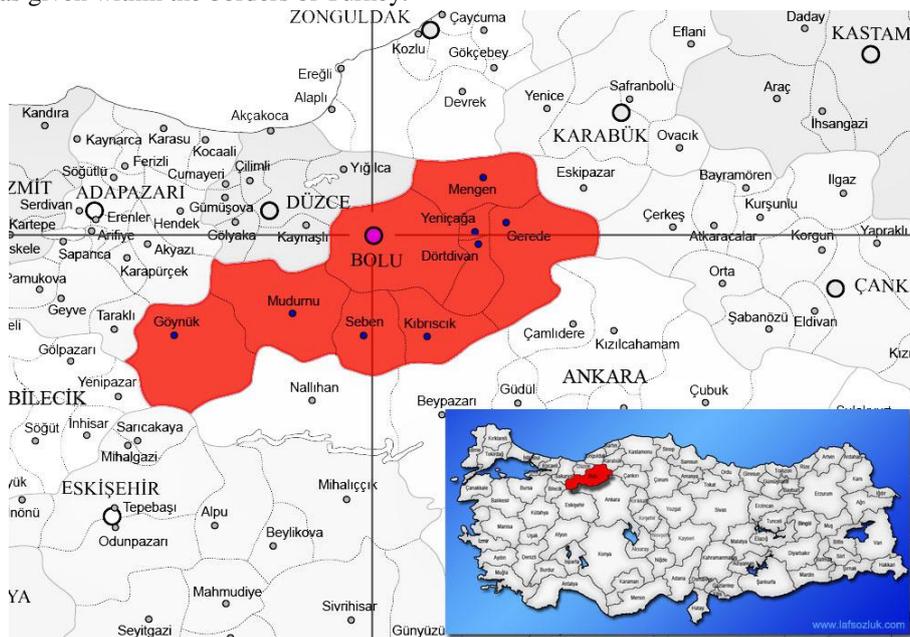


Figure 1: Bolu's location in Turkey [9]

Izzet Baysal Street has never lost its status as the city center and one of the most important recreation centers in all historical phases of Bolu. The study area includes all vital needs and activities such as banks, shops, shopping center, restaurants, cafes, business centers, town hall, governor's office, bus and taxi stops.

The satellite image of the Izzet Baysal Street which constitutes the study area was showed in Figure 2. Izzet Baysal Pedestrian Street which is the main material of this study is located within the Karacıyır Quarter of the central district. The length of Izzet Baysal Street is approximately 850 meters. The pedestrian street is often used during of the year due to street activities including official ceremonies, concerts, exhibitions, open-air meetings,



demonstrations and Ramadan activities. With the above mentioned features Izzet Baysal Street turns into a place where the citizens are constantly together, share the urban and the city's culture and which allows the communication.

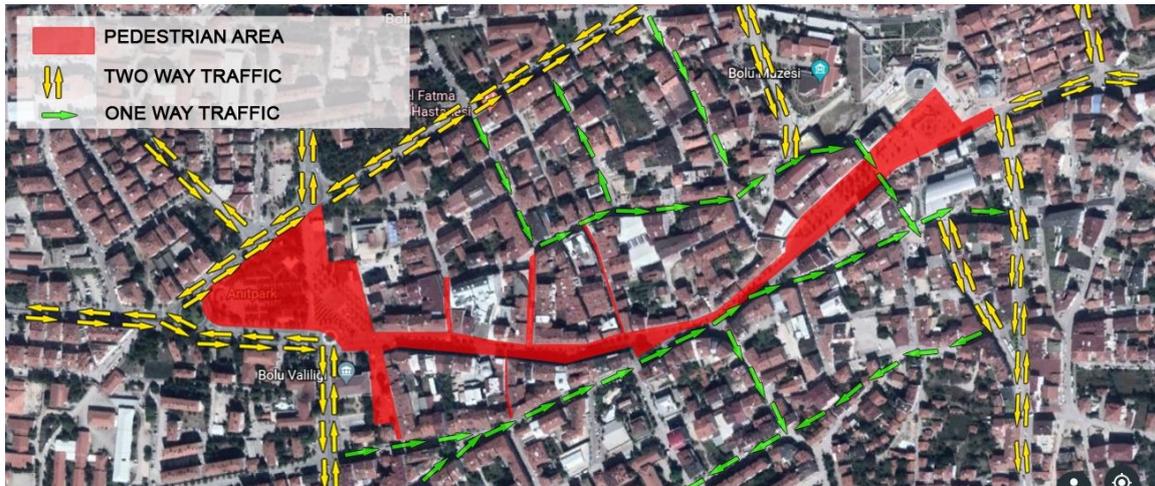


Figure 2: Borders of the study area in Bolu

Another material of the study was the questionnaire applied to the users. Due to the questionnaire the functions owned by a pedestrian zone in general and the functions of the Izzet Baysal Pedestrian Zone which was the study area were compared. Photographs taken from the area, articles, hand-outs, post graduate theses found on the related topic as the result of domestic and foreign literature review, are among the materials of the study. The general view of the pedestrian zone is shown in Figure 3.

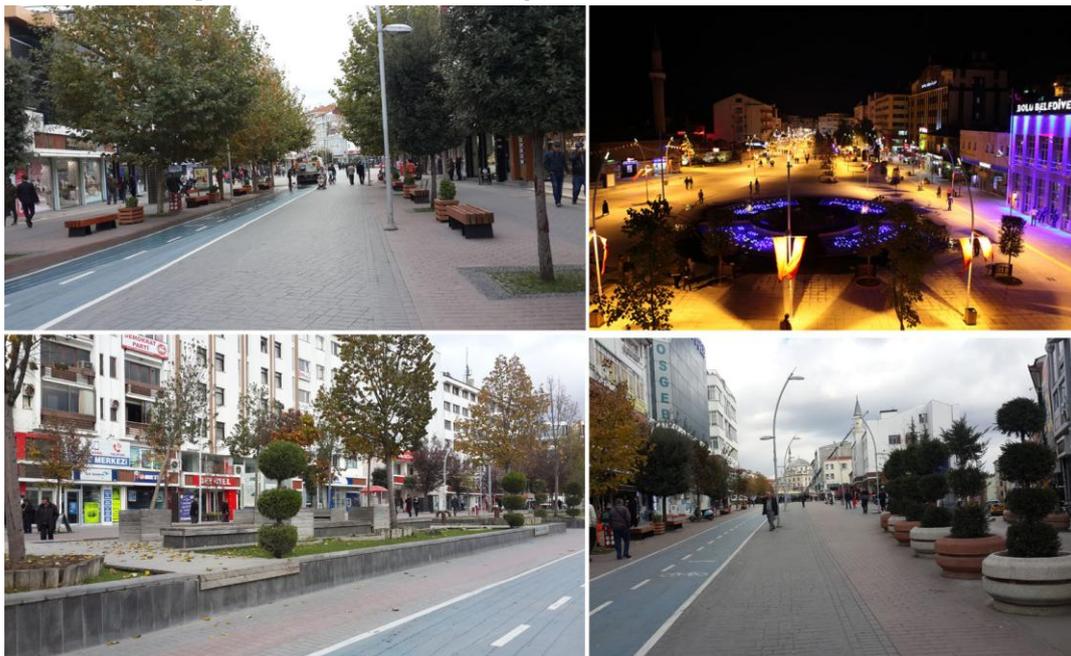


Figure 3: Some appearances of the Izzet Baysal Street

The method of the study can be explained in three work packages. The first work package includes the studies intending to determine the functions of a pedestrian zone in general. In this sense, the similar studies were reviewed in the literature and about 25 functions found in the pedestrian zones, were identified [10, 11, 12, 13, 14, 15]. Then in order to determine the functions of the Izzet Baysal Pedestrian Zone, observation was carried out and photographs were taken. As a result of this process it was identified that there were 10 functions existing within the Anitpark. These can be listed in the following way; flooring, water usage, lightning, resting elements, dustbin, shade elements, presence of plants, drainage, proximity to public transport and car parking areas and barrier free design.



The second work package covers the preparation of the questionnaires and the implementation studies including the conditions of the existence of the above mentioned function within the pedestrian zones in general and also within Izzet Baysal Pedestrian Zone which was the working area. It was separately scored that in which degree these 10 functions have to be included within a pedestrian zone in general and in what extent these function were found in Izzet Baysal Pedestrian Zone. The scoring was carried out in the following way; the availability status of the function generally in a square; 5 points certainly it should be available, 4 points very good if it is available, 3 points does not matter whether is it available or not, 2 points it is better if it is not available, 1 point certainly it should not be available. The availability status of the functions in the Izzet Baysal Pedestrian Zone; 5 points certainly adequate, 4 points sufficient, 3 points nor sufficient neither insufficient, 2 points insufficient, 1 point absolutely insufficient. The surveys were applied to 150 people. At the same time these people were subjected to another prerequisite; they must have participated in a user experience on the working field. Because it was found out that the experience in a similar work was important and influenced the result [16, 17].

Within the scope of the third and final work package the obtained survey results were analysed statistically and comparisons were carried out between the availability status of the functions existing in Izzet Baysal Pedestrian Zone and availability status of the functions which are available in a pedestrian zone in general. For this purpose, the Paired Sample T Test was conducted. This test is used for the determination whether the difference between the results of two different fields belonging to the variable of a group or sample is important or not at a certain confidence level by comparing the mentioned results [18]. Similarly, it can be investigated whether there is a difference between two interrelated or paired groups by using this test [19]. The result of the analysis is given in the significance column. If this value is less than 0,05 (for 5% significance level) then it can be said that there is a significance difference between the two paired groups. According to these evaluations, recommendations were developed for the functions felt to be missing by considering the current situation of the area.

3. Findings

3.1. Evaluations on the Pedestrian Zone Functions in General and the Research Area

According to the results of the survey, the values describing the expectations from the functions in the pedestrian zone are given in Table 1. According to the Table 1, the highest average with 4,86 point was received by the lighting function. The lowest average score with 4,35 points belonged to the water usage. In all functions, the expectation average was observed above 4 points. The score of 8 functions is above 4.5. The participants of the survey stated that the all functions are so important and necessary for a pedestrian zone. The highest score with 631 points was obtained by the lighting function while the lowest score with 566 points was obtained by the water usage function.

Table 1: Average points for a general pedestrian zone (general expectations).

Function	N	Min.	Max.	Mean	Total point
Pavement_General	130	1,00	5,00	4,6538	605
Water_General	130	1,00	5,00	4,3538	566
Lighting_General	130	3,00	5,00	4,8692	633
Resting_General	130	3,00	5,00	4,7692	620
Garbage_General	130	3,00	5,00	4,8538	631
Shadowing_General	130	3,00	5,00	4,6923	610
Plant_General	130	2,00	5,00	4,7923	623
Drainage_General	130	1,00	5,00	4,7308	615
PublicTrans_General	130	1,00	5,00	4,5077	586
Barrier_Free_General	130	1,00	5,00	4,6634	608

Table 2 shows that the average points for sample area Izzet Baysal Pedestrian Zone. The scores in the table are the points that indicate the current situation given by the users. According to the Table 2, the highest average with 4,48 point was received by the barrier free design function. The lowest average score with 2,67 points belonged to the planting function. Only 1 function was able to get a value above 4 points. The average score of 4 functions remained below 3 points. The highest score with 579 points was obtained by the barrier free design function while the lowest score with 348 points was obtained by the planting function.



Table 2: Average points for sample area Izzet Baysal Pedestrian Zone (current situation).

Function	N	Min.	Max.	Mean	Total point
Pavement_Area	130	1,00	5,00	3,1462	409
Water_Area	130	1,00	5,00	2,8923	376
Lighting_Area	130	1,00	5,00	3,8769	504
Resting_Area	130	1,00	5,00	3,7538	488
Garbage_Area	130	1,00	5,00	3,5308	459
Shadowing_Area	130	1,00	5,00	2,8385	369
Plant_Area	130	1,00	5,00	2,6769	348
Drainage_Area	130	1,00	5,00	2,7769	361
PublicTrans_Area	130	1,00	5,00	3,6846	479
Barrier_Free_Area	130	1,00	5,00	4,4859	579

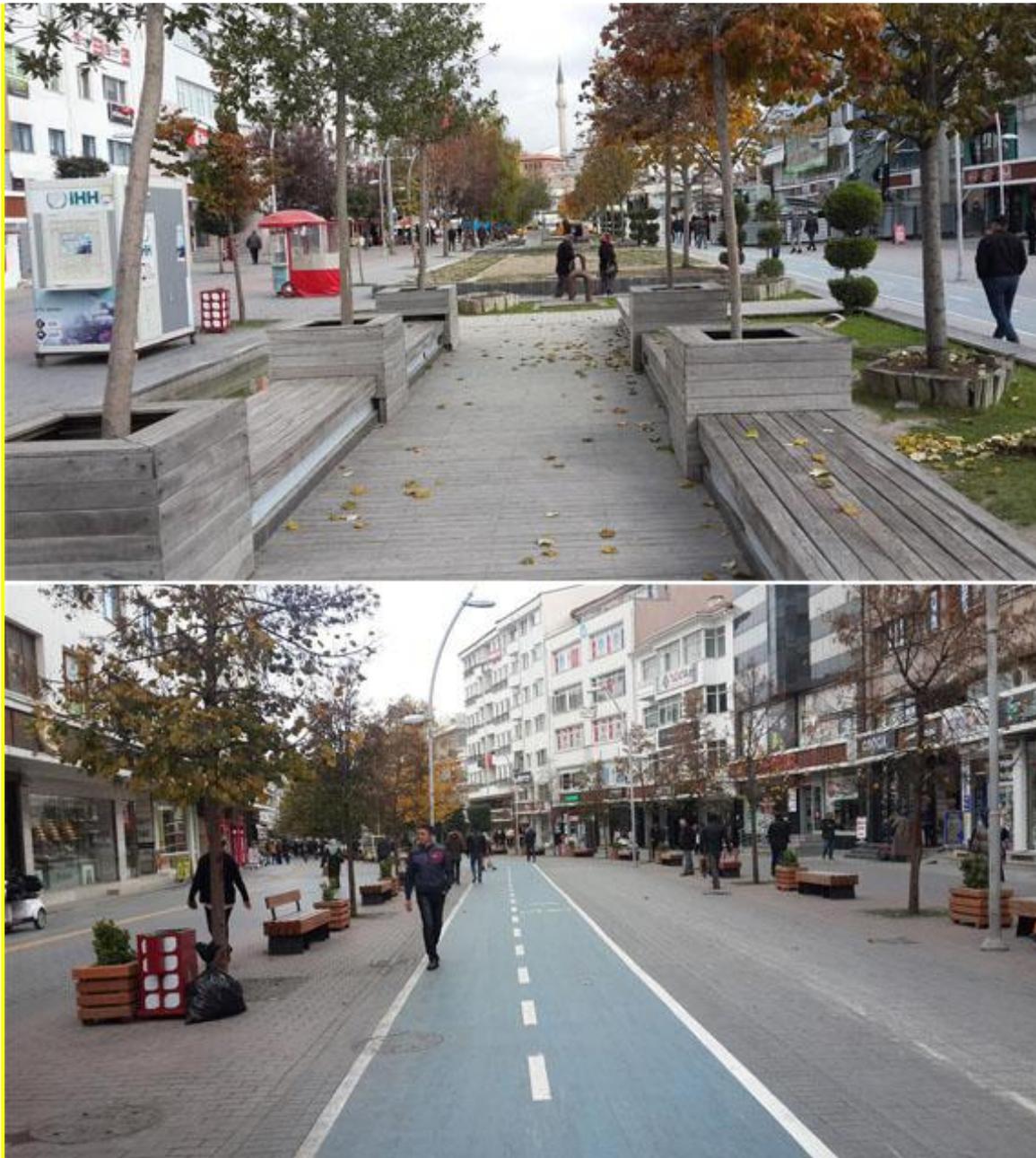


Figure 4: The pavement materials of Izzet Baysal Pedestrian Zone



3.2. The Evaluation of the Pedestrian Zone Existing Functions and Statistical Comparisons

Pavement

Three types of pavement materials were used including grey granite, stamped concrete and stone block pavement as pavement material. Also andesite was added in order to create patterns on the floor, to strengthen the effects of the lines and to add colour. In some resting areas wood material was used for flooring. Images regarding the used flooring were given in Figure 4.

According to the survey results the following conclusions were reached after the comparison between the pavement quality of the studying areas and the pavement functions quality expected to be used on the pedestrian zones in usual. The difference between the general pavement functions of a pedestrian zone and the pavement function of Izzet Baysal Street was significant and could be explained statistically. This difference was positive in general in terms of the pavement function of a pedestrian zone, in other words the pavement quality of the Izzet Baysal Street was found to be 1,5 point lower than it should be in a general pedestrian zone (Table 3).

Table 3: T Test results for pavement function

		Mean	N		Mean Diff.	Sig.
pair 1	pavement (general)	4,6538	130	pavement G - pavement A	1,50769	,000
	pavement (area)	3,1462	130			

According to the survey result, flooring function is absolutely needed in a pedestrian zone and the flooring quality of the study area was found to be insufficient according to the expectations.

Water Usage

It has been observed that water usege is generally located in Anitpark square, on the İzzet Baysal street, in the area where the banks are located and in the municipality square. Generally, the pools where formal lines are used are designed 30-40 cm above the floor level and approximately 50 cm deep. All water surfaces were activated by sprinklers and used lights of various sizes and shapes. In the pool at the Anitpark square, a visual show was provided to the users with the synchronized choreographies of music and jets at certain times, and this show was supported by the use of different colors of lights. In Figure 5 an image was given about water usage in Izzet Baysal Street.



Figure 5: Water usage in Izzet Baysal Street



According to the survey data when the water usage function quality of study area and the water usage function quality expected to be used was compared the obtained result was the following: The difference between the water usage function in a general pedestrian zone and the water usage function in Izzet Baysal Street was significant. According to this the water usage in study area was 1,46 point lower than it was expected in a general pedestrian zone (Table 4).

Table 4: T Test results for water usage function.

		Mean	N		Mean Diff.	Sig.
pair 1	water usage (general)	4,3538	130	water usa G - water usa A	1,46154	,000
	water usage (area)	2,8923	130			

Although there are a lot of pool, according to the survey result, the current situation in the study area was lower than the expectations of a general pedestrian zone for the water usage function.

Lighting

In the study area, the lighting elements are used along the walkways, at the sides of the resting areas, in and around the pools. In general, middle and high lighting elements were used. Some resting areas are equipped with acoustic lighting elements. Figure 6 shows examples of lighting elements used in the study area.



Figure 6: Lighting examples in Izzet Baysal Street

According to the survey data the difference between the lighting function in a general pedestrian zone and the lighting function in Izzet Baysal Street was significant. According to this the lighting in Izzet Baysal Street was about 1 point lower than it was expected in a general pedestrian zone (Table 5). According to the survey result although lighting function is a condition which is expected to be in a general pedestrian zone, the lighting quality of Izzet Baysal Street was insufficient.

Table 5: T Test results for water usage function.

		Mean	N		Mean Diff.	Sig.
pair 1	lighting (general)	4,8692	130	lighting G-lighting A	0,99231	,000
	lighting (area)	3,8769	130			

Resting Equipments

Many options with the purpose of rest in the area are presented to users. Benches with and without backing, seating elements around of trees, Atatürk statue and resting elements in the ceremonial area and steps in the area can be given as examples. The need for resting elements is very high due to the fact that they are located on the transit direction and are used extensively by the users. An example of resting areas is presented in Figure 7.





Figure 7: Resting equipment examples in Izzet Baysal Street

According to the survey data the difference between the resting function in a general pedestrian zone and the resting function in Izzet Baysal Street was significant. According to this the resting function in Izzet Baysal Street was about 1 point lower than it was expected in a general pedestrian zone (Table 6). According to the survey data, the current situation of the resting elements is close to sufficient level but it is below the expectation.

Table 6: T Test results for resting function

		Mean	N		Mean Diff.	Sig.
pair 1	resting (general)	4,7692	130	resting G - resting A	1,01538	,000
	resting (area)	3,7538	130			

Garbage Collection Equipments

In the Izzet Baysal Pedestrian Zone, fixed trash bins were placed at various points along the street to fulfill the garbage collection function. Garbage cans made of plastic and iron material are generally used around the seating units and around the lighting elements. An example of a trash can is shown in Figure 8.



Figure 8: Garbage collection equipment example in Izzet Baysal Street



According to the survey data the difference between the garbage collecting function in a general pedestrian zone and the garbage collecting function in Izzet Baysal Street was significant. According to this the garbage collecting function in Izzet Baysal Street was about 1,32 point lower than it was expected in a general pedestrian zone (Table 7). According to the survey data, the current situation of the garbage collecting elements is below then the expectation.

Table 7: T Test results for garbage collecting function.

		Mean	N		Mean Diff.	Sig.
pair 1	garbage (general)	4,8538	130	garbage G - garbage A	1,32308	,000
	garbage (area)	3,5308	130			

Shadow Equipments

In the study area, the shade material is formed by artificial canopy which is formed on the eastern border of the area. On the western border of the area, trees in the green area also serve as shadow elements. Shading elements are used in combination with side-by-side lighting, garbage and rest functions on a linear line. This field can be shown as an example of using multiple functions together in the same space.

According to the survey data the difference between the shadow function in a general pedestrian zone and the shadow function in Izzet Baysal Street was significant. According to this the shadow function in Izzet Baysal Street was about 1,85 point lower than it was expected in a general pedestrian zone (Table 8). According to the survey data, the current situation of the shadow function is below then the expectation and insufficient.

Table 8: T Test results for shadow function.

		Mean	N		Mean Diff.	Sig.
pair 1	shadow (general)	4,6923	130	shadow G - shadow A	1,85385	,000
	shadow (area)	2,8385	130			

Presence of Plants

In all of the study area, evergreen and deciduous trees, shrubs, seasonal flowers and grass fields were used as planting material. Trees used in the afforestation of Alle trees form the directing effect from the square to the ceremonial area, the main walking axes, the cafes and the street. Evergreen tall plants used behind the Atatürk monument constitute the fund used as a sphere of speech in Atatürk monuments and ceremonies. Examples of topiary art can be observed in the field with frequent planting and pruning of shrub groups not exceeding 30-40 cm. Seasonal flowers, especially in the spring months in the working area in the green area of a small tulip carpet pattern is created by increasing the interest of visitors to the area. Figure 9 is an example of the green areas in the Izzet Baysal Pedestrian Zone.



Figure 9: Planting examples in Izzet Baysal Street

Survey data were showed that the difference between the planting function in a general pedestrian zone and the planting function in Izzet Baysal Street was significant. According to this the planting function in Izzet Baysal Street was about 2,11 point lower than it was expected in a general pedestrian zone (Table 9). This value is the highest difference among all functions. According to the survey data, the current situation of the planting function is below then the expectation and insufficient.



Table 9: T Test results for planting function.

		Mean	N		Mean Diff.	Sig.
pair 1	planting (general)	4,7923	130	planting G - planting A	2,11538	,000
	planting (area)	2,6769	130			

Drainage

The drainage in Izzet Baysal Street is provided by surface and underground removal system. Some problems are occasionally observed in the discharge of surface water. Figure 10 showed the rack which was a part of the drainage system in study area.

*Figure 10: Part of the drainage system in Izzet Baysal Street*

According to the survey data the difference between the drainage function in a general pedestiran zone and the drainage function in Izzet Baysal Street was significant. According to this the drainage function in Izzet Baysal Street was about 1,95 point lower than it was expected in a general pedestrian zone (Table 10). According to the survey data, the current situation of the drainage function is below then the expectation and insufficient.

Table 10: T Test results for drainage function.

		Mean	N		Mean Diff.	Sig.
pair 1	drainage (general)	4,7308	130	drainage G - drainage A	1,95385	,000
	drainage (area)	2,7796	130			

Proximity to Public Transport and Car Parking Areas

The closest bus stops to the area are located on the streets north and south of Izzet Baysal Street. Bus routes are planned to circulate around the working area. Bus stops are about 3-5 minutes walk away. Only one type of private public buses (minibuses) are used as public transportation vehicles. In addition, bus companies use these routes. Although the parking lots in the walkways of about 5-10 minutes respond to the needs of the users, it is not sufficient in today's high traffic and the parking area problem affects the area around the area.

Survey data were showed that the difference between the public transport function in a general pedestiran zone and the public transport function in Izzet Baysal Street was significant. According to this the public transport function in Izzet Baysal Street was about 0,80 point lower than it was expected in a general pedestrian zone (Table 11). This value is the lowest difference among all functions. According to the survey data, the current situation of the public transport opportunities and car parking function is below then the expectation and insufficient.

Table 11: T Test results for public transportation function.

		Mean	N		Mean Diff.	Sig.
pair 1	public_trans (general)	4,5077	130	public_tr G - public_tr A	0,82308	,000
	public_trans (area)	3,6846	130			



Barrier Free Design

The study area has a flat land structure in general. The pedestal on the plastic element in the area and the section designed as a concert area are located on the step. Since the step in the vicinity of the Atatürk monument is not part of the circulation system in the area, it has no negative effect on unimpeded transportation. In the concert area, access to the area is provided by disabled people with a ramp on the side of the steps. The connection of the area with the roads around the area was solved by ramps in some places, thus contributing to the unimpeded design. Throughout the work area, the entire floor area can be felt so that the floor can be felt, allowing visually impaired users to use the space.

Significant difference was not found between the barrier free design function quality expected in general and the quality of the Izzet Baysal Street's barrier free design function. The reason for this was that the scores were so close to each other that they could not create significant difference. In other words the expectations towards the barrier free design functions in general were met by Izzet Baysal Pedestiran Zone.

4. Results and Discussion

The pedestrian zones contain many functions. Recreational activities such as resting, cycling, hiking and shopping are some of these. According to Kuta and Ermiş (2015) if a square has more than one function then it ensures an increase in the number of users and it can be addressed by different segments and age groups [15]. In this study, Izzet Baysal Pedestrian Zone was evaluated in terms of the functional features it had. This evaluation was performed by comparing the same functions with the general pedestrian zones. As a result, when the Izzet Baysal Pedestiran Zone is examined in terms of its functions, the following conclusions are reached:

The flooring, water usage, lighting, resting, garbage collecting, shadow, planting, drainage and public transport proximity-car parking functions were found insufficient level when they were compared with the expectations. While the competence level of the barrier free function was found to be similar to the generally expected level. Therefore these differences could not be explained statistically. In a similar study that was made for Düzce City, the functions of a city square were compared with general squares. Accordingly, some functions were found to be of higher quality than expected, while others were of lower quality [20].

In urban areas, it is observed that wrong material choices have been made for structural applications in many public places and that there are problems of infrastructure and workmanship in practice. The most important reason for this is economic problems [21]. From this point of view, rehabilitation works should be carried out regarding the functions of Izzet Baysal Street Pedestrian Zone with low level of competence.

The flooring material should be selected according to the climate, and these materials should be used with respect to basic design elements and principles (line, texture, color, form, harmony, contrast, hierarchy, repetition, accent, orientation etc.). Lighting is an important factor especially in terms of safety. Within the study area, low and medium high lighting elements should be placed and the function of these elements should be increased by strengthening the sitting, resting and shadow elements within its near environment. In this way, the quantity of the shadow elements whose lack was perceived can be increased. Garbage collectors must be leak-proof, easily accessible, made of material that will not be easily damaged, and garbage collectors should be provided throughout the area. The green fields should be strengthened by including species from the following groups grass and other groundcovers, seasonal plants evergreens and deciduous shrubs and trees. The maintenance of these green fields should be done regularly. According to Yerli (2016) the green spaces which have been created in this way will not be used only as a green area but will bring along the use of the functions such as sitting, resting shadow and siege at the same time [20].

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