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Legibility of Neighborhood Park: A Case Study of Trabzon City Centre

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Abstract: The growing need for housing in parallel with population growth has made the importance of open spaces more prominent in rapidly growing cities. Among them, urban parks and management for open spaces are one of the important parts of urban planning. Neighborhood parks are the most basic element of municipal outdoor management systems in particular. The main function of the neighborhood parks is to provide socio-cultural interaction facilities that meet user needs, are such as accessibility, legibility, have many functions together and enable the active and passive activities of users. High legibility level, well-designed parks at the neighborhood level serve as a social and activity center for the users, transforming into high-level, living spaces. In this context, interest in the perception and experience of the community, neighborhood parks has reached a very important point today. Today, however, research continues to seek answers to the question of how people react to and use parks in their living environment. One of the concepts that has recently become the focal point in this regard is the concept of legibility. In this context, this study aimed to reveal the legibility level of three parks randomly selected from the neighborhood parks located in Ortahisar district of Trabzon province and completed in 2017. In this direction, the legibility level and the physical and characteristic features and activities of the neighborhood parks were examined in this study, and their suitability and deficiencies for landscape design and usage were determined. As a result of the research, it was determined that the legibility level of the examined neighborhood parks is low and the usage level of the parks is low, resulting in inanimate spaces and suggestions for improvement of these parks are presented.

Keywords: Open spaces, Neighbourhood parks, Legibility, Structural equation modeling

Introduction

Currently, the increasing need for housing, rapid and unplanned urbanization apparently indicate the significance of open public spaces. Along with the escalating urban density in city centers, the open spaces are becoming inadequate and the requirement for these areas increase. Open public spaces vary in dimension, form and the functions they provide. Open public spaces generally vary with respect to being in a neighborhood, in a city or being a regional open space. Open public spaces are regarded as a common ground for establishing a better quality of life regarding the physical and social characteristics they offer (Montgomery, 2013). Neighborhoods, which could be accepted as the most basic constituents of cities, are the most intensely affected units from the reduction of open spaces. Besides being the centers that facilitate the foundation and development of cultures, neighborhoods also refer to the spaces of inhabitance. Along with the concept of inhabitance, neighborhoods have a sense of social structure and acted as the facilitator of social organization throughout the history. Ongoing urban transformation efforts in Turkey caused spatial and social discriminations on neighborhood scale. The open spaces neighborhoods provided are gradually diminishing and this problem adversely affects the neighborhood inhabitants in terms of their satisfaction levels with their living environments. Interventions towards the physical and social characteristics of neighborhoods cause problems such as alienation and lack of communication, thus, the neighborhoods become places where feeling of

community cannot be formed. Therefore, it is highly significant to emphasize the concept of open spaces within the neighborhood scale.

Neighborhood Parks

Neighborhood parks should be taken into consideration as a priority, along with the other open spaces of the city. Neighborhood parks provide outdoor spaces that the users could experience various interactions and share interests (Gehl & Svarre, 2013). Inhabitants of the urban and neighborhood contexts usually prefer neighborhood parks, which could as well be expressed as the nearest breathing spaces, in order to satisfy their needs of recreation, to take a relief from the tiredness of the day, to relax and to fulfill their needs regarding socializing. Here, one of the issues that should be emphasized as a priority is understanding whether the neighborhood parks are preferred or not. Accordingly, it would be reasonable to take the perception, attitude, and evaluations of the individuals towards their living environment into consideration. In general terms, social spaces, which are within the scope of open spaces, are shaped according to the requirements of different age groups. In areas such as neighborhood parks, it is highly significant to consider the requirements of age groups such as children and adults (Düzenli & Özkan, 2016).

Neighborhood parks, which could be referred as the spine of park systems, should accommodate various activities for the users and should comprise a variety of characteristics, such as accessibility, legibility etc. that meet the user requirements. Neighborhood parks should allow active and passive activities and provide spatial characteristics for sitting, resting, relaxing, getting into interaction, getting acquainted, and distancing oneself away from city life (Moulay & Ujang 2016). Studies conducted in recent years established that there exists alienation, lack of social interaction and communication in urban areas. In this respect, spaces with high legibility, which promote outdoor activities, enable social interaction and render the landscape elements easily identifiable, are considered important, especially for neighborhood parks. The objective of the present study is to discuss the concept of legibility, as one of the basic features of effective open spaces, within the context of neighborhood parks. Therefore, prior to describing the research method employed in the present study, it is essential to explain the concept of legibility and its significance in terms of neighborhood parks.

Legibility and Legibility Perception

Legibility, which could in general be provided through an effective open space design, is one of the key features directly related to the utilization and recognition of a park. Lynch (1960) defines the concept of legibility as the identifiable and coherent structure of constituents. In their study conducted on the legibility of neighborhood parks, Amine Moulay, Norsidah Ujang and Ismail Said described the concept of legibility as an understandable structure that does not have visual obstructions and that is defined through the qualities of accessibility and indicated that the environments with these characteristics enabled social interaction through increasing confidence in the users through affecting the usability of the space (Moulay, Ujang & Said, 2016). As comprehended from these definitions, legibility, which enables a better accessibility and better-defined features in open spaces in line with the consistency provided through landscape items, is considered as one of the basic features of the effective urban spaces.

The concept of legibility, which is one of the urban design principles, expresses the environmental characteristics that enable to create and organize a cognitive map (Herzog and Leverich, 2003). The legibility of an environment corresponds to obtaining the spatial information from the surroundings, shaping this information in the mind, and utilizing it appropriately (Köseoğlu & Erinsel, 2010). According to this definition, legibility consists of the perception of the environmental characteristics of the space. The present study, which was based on the problem that the physical and social characteristics of the neighborhoods were negatively affected by the increasing urban density in city centers, aims to elucidate the sub-dimensions of the concept of legibility in terms of neighborhood parks and the relationship between these sub-dimensions.

Material and Methods

The present study was conducted in three different neighborhood parks connected to the central district of the Trabzon province in Turkey. In order to reveal the legibility level in neighborhood parks, a survey was conducted with the users of the parks in the Pelitli, Çukurçayır and Aydınlıkevler neighborhoods. The case areas, their location in the city, their sizes and facilities for activity are presented in Table 1.

Within the context of the present study, Moulay and Ujang's (2016) legibility scale, composed of 14 expressions, was utilized in order to determine the legibility level of the neighborhoods. 90 users participated the survey and responded these 14 expressions through a five-point Likert scale. The participant responses were analyzed with the software SPSS 24.0. Initially, the aim was to determine the sub-dimensions for the scale by using a descriptive factor analysis and consequently the reliability of the scale was established by confirmatory factor analysis. The obtained legibility dimensions and their mean values based on neighborhood parks were scrutinized.

Table 1. Location and facilities for activity for the studied neighborhood parks

Name	**Scale**	**Size**	**Activity Opportunities**	**Image**
Soğuksu, Muhsin Yazıcıoğlu Park	Neighborhood	7200m^2	Sport Playground Relaxing Walking Sitting Watching	
Kalkınma Neighborhood Park	Neighborhood	5653m^2	Sport Playground Relaxing Walking Sitting Watching Eating	
University Neighborhood Park	Neighborhood	11370m^2	Sport Playground Relaxing Walking Sitting Watching Eating	

Findings

Validity and Reliability Analyzes of the Scales Used in the Survey

The first part of the questionnaire was intended to reveal how the users of neighborhood parks evaluated the legibility levels of these parks. Table 2 presents the mean values and factor analysis results regarding the legibility of the parks. Kaiser-Meyer-Olkin (KMO) coefficient test was applied to determine whether the data obtained from the users were suitable for factor analysis. The KMO coefficient was determined as 0,686. This result implied that the sample size was adequate for factor analysis and that the data was suitable for factor analysis. The legibility scale composed of 14 expressions was reduced to 11 expressions subsequent to the exploratory factor analysis (EFA) and the mean value was determined as 3,36 (Table 2).

Table 2. Results of the exploratory factor analysis for the legibility scale

Factors	***X***	**Factor**
Accessibility (Explained Varience:31,369) (α: 0,812)		
(ac3) People use the park frequently	3,75	0,882
(ac1) There are more than one entrance to access the park	3,53	0,869
(ac2) Most of the area is suitable for walking	3,85	0,797
(ac4) The park is well connected with the residential area	3,34	0,706
Visual obstacles (Explained Varience:20,123) (α: 0,841)		
(cs5) There are many landscape elements	3,40	0,780
(cs6) The walkways are very comfortable to use	3,43	0,735
(cs3) The location of the park is very convenient	2,87	0,709
(cs4) There are many gathering places	3,39	0,700
Clear structure (Explained Varience:13,037) (α: 0,836)		
(vo3) The park has direct views with good ability to see	2,93	0,833
(vo4) There are more than one entrance to access the park	3,69	0,755
(vo2)The face to face arrangement of the seating allow me to talk with others	2,80	0,734
Total Variance (%) 64,529		

Three sub-dimensions, which explained the legibility measures of the neighborhood parks according to the participant responses with a resultant 64,529% variance, were determined and were presented in Table 1. According to the results of the analysis, the first factor was "accessibility". This factor alone constituted 31,369% of the total variance and the Cronbach Alpha value was calculated as 0,812 for this factor. The second factor was determined as "visual obstacles", and accounted for 20,123% of the total variance, with a Cronbach Alpha value of 0.841. The third factor was "clear structure" and accounted for 13,037% of the total variance and its Cronbach Alpha value was 0,836.

Relations Between the Sub-Dimensions of the Perception of Legibility

Factor analysis was performed with the SPSS software and the factor structure and factor loads were determined. Yet, it is not possible to examine the model fit and the relationship between latent variables. Nonetheless, it is possible to examine the model fit and the relationship between latent variables through a structural equation modeling, where factor analysis and regression analysis could be used together. Within the scope of the present study, AMOS 20 software was used to determine the model fit and the relationships between the factors, through confirmatory factor analysis (CFA).

The analyses were performed via the Maximum Likelihood method. While testing the fitness between the model and the data for model fit, it could be preferred to use several or all of the goodness-of-fit tests (Schumacker, 2006: 120).

The results or the analyses are presented in Table 3. It could be observed that X^2/DF had a value of 1,68 (69,274/41), p=,004<.01 and it was in compliance with the standard; the root mean square residual (RMR), goodness-of-fit (GFI), adjusted goodness-of-fit (AGFI) and comparative fit index (CFI) were respectively determined as **0,039,** 0,878 0,804, and 0,901, which were either equal or approximate to the value of 0,90 defined by the standard. Root mean square error of approximation (RMSEA) was found as **0,073**, which was **lower** than the standard **0,080** defined for an acceptable goodness-of-fit. Consequently, the goodness-of-fit for the scale was found to be acceptable presenting a better construct validity. Hence, the validity of the legibility scale determined through an exploratory factor analysis was confirmed via the confirmatory factor analysis.

Table 3. Goodness of fit of Neighborhood Park Legibility Scale

Fit index	***X2***	***DF***	***X2/DF***	***RMR***	***GFI***	***AGFI***	***CFI***	***RMSEA***
	69,274	41	1,68	0,049	0,878	0,804	0,901	0,073

Table 4 presents the standardized regression weights. The regression values indicate that the observed variables demonstrate the capability in estimating the hidden variables, in other words, the factor loadings. For each pair in Table 3, factor loadings were significant since their "p" values were less than 0.01. These results denote that the items were correctly assigned to the factors. Once the standardized regression weights were scrutinized, it was found that they ranged from 0.511 to 0.873. The values of all indicator variables regarding the regression

coefficients were quite significant (p: 0,000). The diagram of the model obtained through the confirmatory factor analysis is provided below.

Table 4. Non-standardized regression coefficients between the hidden variables and indicator variables in the measurement model

			Estimate	S.E.	C.R.	P
cs5	<---	F2Clearstructure	1,000			
cs6	<---	F2Clearstructure	1,004	,244	4,120	***
cs3	<---	F2Clearstructure	,622	,176	3,539	***
cs4	<---	F2Clearstructure	,786	,206	3,819	***
vo3	<---	F3Visualobstacles	1,000			
vo4	<---	F3Visualobstacles	,741	,168	4,399	***
vo2	<---	F3Visualobstacles	,684	,143	4,766	***
ac3	<---	F1accessibility	1,000			
ac1	<---	F1accessibility	,929	,111	8,344	***
ac2	<---	F1accessibility	,867	,116	7,471	***
ac4	<---	F1accessibility	,774	,125	6,203	***

The diagram of the model obtained through confirmatory factor analysis was presented in Figure 1.

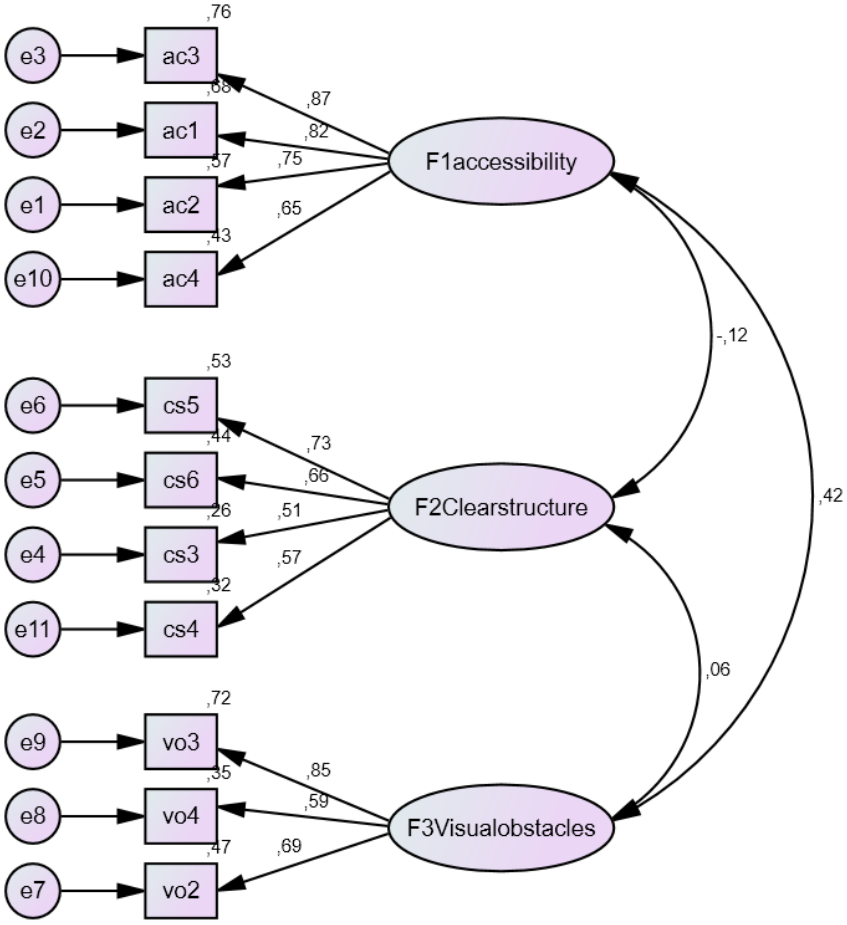

Figure 1. CFA Model comprised of 11 items

Discussion and Conclusion

The concept of legibility in neighborhood parks was assessed via the readability scale of Moulay and Ujang (2017), within the scope of the present study. Due to determining the appropriateness of the 14 legibility scales

to factor analysis, explanatory factor analysis (EFA) was initially performed in the SPSS 24.0 software. According to the outcomes of this analysis, a three-factor structure was identified and these they were named as visual obstacles, accessibility and clear structure. Consequent to the analysis of factor structure and factor loadings, a confirmatory factor analysis (CFA) was performed via the AMOS 20 software. With respect to the confirmatory factor analysis, the compliance analysis, which focuses on the fitness of the research model, indicated that the model was well saturated and had a good fit. Such outcome supported the three-factor structure of the concept of legibility and its sub-dimensions, similar to the outcomes presented by Moulay and Ujang (2017). The dissimilarity of the present study was the explanation of the model through 11 expressions, not through 14 expressions.

Considering the fact that, in recent years, urban transformation was addressed in the scope of neighborhood transformations in Turkey, the significance of neighborhood parks becomes highly evident. Within the scope of the present study, it was determined that the factor that best explained the perception of legibility in neighborhood parks was the accessibility factor, among the three different spatial characteristics. The other factors were, respectively, clear structure and visual obstacles. This outcome demonstrated that easy accessibility and visibility directly affected the legibility of neighborhood parks. In their studies, which focused on determining the effective service range of neighborhood parks, Kellett and Rofe (2009) and Duncan et al. (2011) stated that the service area radius of the parks was 800 meters and such levels of accessibility was one of the most important factors that defined the utilization of these parks. The outcomes of the present research supported these studies through expressing the significance of accessibility in neighborhood parks.

In literature, studies, focusing on this subject, express concepts such as easily identifiability and legibility of landscape elements as one of the fundamental dimensions that affect the liveliness and utilization of the parks. With respect to this statement, especially legibility and the relationship between the social interaction concepts in neighborhood parks, places a greater emphasis on this issue. Social interaction in neighborhood parks is also related to concepts such as a sense of belonging to the neighborhood and a sense of community. Therefore, future studies could focus on the relationship between the concept of legibility in neighborhood parks and concepts such as social interaction, place attachment, and neighborhood attachment.

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