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**AHMET TUĞRUL POLAT**

Selcuk University, Turkey

## **VISUAL QUALITY ASSESSMENT IN LANDSCAPE ARCHITECTURE**

### **Abstract:**

Landscape is a 'meta-structure of relations between different systems' geomorphologic, ecological, environmental, historical-cultural, aesthetic, socio-economic, territorial that includes all genetic, biological and functional relations among the components of each part of the earth's surface. The visual quality of landscape is one of the most important factors of the interaction between humans and nature. Its measurement and evaluation is very difficult. The changing structure of the environment effects the user perceptions constantly and improvement of this visual character gains importance to meet human's aesthetic demands and expectations. The researchers from several disciplines have been making effort for 40 years in order to understand how the visual quality of the landscapes formed and to determine which variables are effective on the visual quality. In this study, the concepts related to visual quality and visual quality assessment approaches were described. By literature studies, Information about the research results of visual quality in landscape architecture was given.

### **Keywords:**

Environmental Physiology, Landscape Architecture, User Perception, Visual Quality Assessment

**JEL Classification:** R11, Q50, Z10

## Introduction

As living standards improve and global environment problems worsen, there is an increasing public concern about sustainable development and the scenic beauty of the outdoor environment (Liao and Nogami, 1999). Therefore, urban landscapes whose aesthetic value is high and which are more preferable have become a requirement (Akbar et al., 2011).

Within the field of environment and behavior, perception of environmental quality is a basic study field for researchers (Brown and Daniel, 1987). Analyzing perception and preference of people about landscape environments is a subject that needs to elaborate on. In this way, different spatial variables that would influence landscape preference of people can be determined. It is necessary to analyze the relation between urban life experience and perception of people and design of landscape areas. In this sense, terms of visual perception and visual quality come into prominence.

## Concepts

*Beauty:* Plato is the first philosopher who systematically examined what “beautiful” is within the perspective of entity and knowledge (427-347 B.C.). According to Plato, beautiful things are not the beauties formed in the universe by the objects seen on this world but the idea of beauty in the world of ideas. Beauties mentioned in the environment we live seem beautiful to people as long as they take share from the idea of beautiful that is real. Therefore, beauty we see all around is not the real beauty but its copy (Lothian, 1999).

*Aesthetic:* Aristotle (384-322 B.C.) analyzed aesthetic in mathematical sense. According to Aristotle, three components are required for beauty; integrity (integras), concordance (consonantia) and radiance (clarity). Terms of balance, harmony, ratio, order, and “Golden Ratio” emerged from this cultural resource (Çakıcı, 2007). A.G. Baumgarten is the philosopher who used the term aesthetic as an independent discipline for the first time (1714-1762). According to him, aesthetic is “the science of thinking over beauty” (Kaptanoğlu, 2006).

*Perception:* Perception is the process of choosing, arranging and interpreting knowledge received through senses (Bell, 1999). While the perception of the environment is realized with several senses (sight, feeling, hearing and touching), the most important one of them is the sight. More than 80 % of the sensual input of the human is provided by the sight. Therefore, the most part of the perception of the environment is born visually (Çakıcı and Çelem 2009; Elinç and Polat 2012).

*Preference:* Preference is a thought related with “approval” based experience of person. According to Kaplan (1978); considering evolutionary process of person, preferences are closely related with basic requirements. In other words, preferred environments would be places in which people are more active and their requirements are mostly fulfills (Çakıcı,

2007). Preference of people for a landscape is based on his skill to understand that landscape (Walker and Ryan, 2008).

*Environmental Psychology:* Environmental psychology is a practical field of science, which analyzes the complicated relation between human and physical environment and aims to enhance quality of human habitat. Environmental psychology which appeared in 1960's seeks answers for "how" and "why" in the sense of human-environment interaction while analyzing these complicated relations between people and his environment (Çakıcı, 2007).

*Landscape:* Landscape is a 'meta-structure of relations between different systems' geomorphologic, ecological, environmental, historical-cultural, aesthetic, socio-economic, territorial that includes all genetic, biological and functional relations among the components of each part of the earth's surface (Brunetta and Voghera, 2008).

*The visual quality of landscape:* Visual landscaping quality is a mutual product of distinct (visible) landscaping features which are in interaction with the perceptual and emotional psychological processes of the observer. The way this effect of the environment on humans which is converted into behavior is interpreted and evaluated is defined as "visual landscape quality" formed as a result of visual perception process. Visual landscape quality can be defined as "relatively aesthetic impeccability of a landscape" and it can be measured through the appreciation of the observer (Lothian 1999; Daniel 2001; De La Fuente et al., 2006).

## **The approaches of visual quality assessment**

As stated above, as visual quality is based on the experiences and judgments of the people, it is very difficult to measure scientifically and objectively (Chen et al., 2009). Visual landscape assessment covers the inventory and evaluation of several visible characteristics of the landscape for the purposes of planning, design and management (Palmer and Hoffman, 2001).

Since 1960s, different approaches have been developed, many of which are based on assessing the landscape's physical, aesthetic and psychological attributes (Daniel and Boster, 1976; Ulrich, 1986; Zube, 1987; Kaplan and Kaplan, 1989; Purcell and Lamb, 1998; Daniel, 2001). Methods for assessing landscape preference can be classified as three approaches: the expert (objectivist or physical paradigm), public approach (subjectivist or psychological paradigm) and the expert/public approach (psychophysical paradigm).

### **Expert models (objectivist or physical paradigm)**

This approach pre-supposes the landscape has inherent landscape quality, that landscape quality is a physical characteristic that can be evaluated similar to physical features (Lothian, 1999). It includes formation of field inventory considering landscape characteristics and elements which are thought to have effect on landscape beauty

(Daniel and Boster, 1976). The expert approach relies on the opinions and judgments of experts, considering quality as an inherent characteristic of the object viewed and evaluating the landscape through abstract design parameters (Bernasconi et al., 2009). As an approach, planners and geographers would accept landscape as a quality that would be classified and mapped considering soil types, field forms or vegetation and forming specific assumptions for this, they evaluate "landscape" in the sense of physical qualities by setting assumptions (e.g. mountains and rivers have high landscape quality). Expert models use cartographic characteristics (qualitative or quantitative) to calculate an integral preference score for a given landscape. Otherwise, public preference models (subjectivist) make use of questionnaires investigating preference in combination with statistical approaches to generate a landscape score (Garré et al., 2009).

Visual quality was researched by some researchers by using GIS and map-based methods (Germino et al., 2001). In the regional planning studies, the landscape's visual measurement and valuation gains importance on planning decisions (Uzun and Müderrisoğlu, 2011). The diagnoses of these studies form a basis to the planning and designing studies about natural and rural territories protection and usage.

The expert approach to landscape quality assessment has been dominant in environmental management practice (Daniel, 2001). These approaches may be seriously deficient in terms of sensitivity, reliability and validity. In addition, professional judgment approaches tend to be incompatible with government policies that increasingly require public input in decision, affecting both natural and urban landscapes (Misgav, 2000). In contrast to objective approaches, subjective approaches are more preferred and are considered to be more reliable.

### **Public approach (subjectivist or psychological paradigm)**

In the subjective approach, a landscape's visual aesthetic quality is considered to be a product of the visible features of the landscape as related to how it interacts with psychological processes taking place in the human observer. This approach can be assessed through sensory-perceptual parameters or cognitive constructs (De La Fuente et al., 2006).

This group of studies relies on perception-based assessments or ratings from the general public gathered through written and photographic surveys. Therefore, the understanding of the elements, which determine the quality of scenes, is derived from subjective perceptions (Bernasconi et al., 2009). This model evaluates preferences of society about landscape by using statistical methods (multiple regression analysis, factor analysis etc.) (Lothian, 1999). Compared to the expert approach, perception based assessments have generally achieved high levels of reliability (Daniel, 2001).

## **Expert/public approach (psychophysical paradigm)**

The third group in landscape quality assessment uses psychophysical methods to examine community preferences for landscapes and then through statistical analysis, derive the overall quality of the landscape (Lothian, 1999; Misgav, 2000; Bernasconi et al., 2009; Vouligny et al., 2009). A synthesis of both approximations, i.e., of the “expert-based” and “observer-based” methods, would provide a more comprehensive approach to the study of landscape quality (De La Fuente et al., 2006). This approach is derived from the psychophysical tradition in psychology, in which quantitative indices based on human perceptual responses are used as a gauge of properties of objects, where the perceptual indices refer directly to objects (Meitner, 2004). This approach is objective in that it measures community preferences without the influence of the researcher's personal preferences or biases, although biases may occur in framing the questionnaire and in the evaluation of the results (Lothian, 1999). This approach has found favor in recent years and is supported by the use of statistical techniques to determine the mathematical relationships that exist between landscape components and the scenic preferences of observers (Arriaza et al., 2004).

## **The research of visual quality in landscape architecture**

### **Literature Researches**

Landscape quality is often defined as including a wide range of environmental, ecological, socio-cultural and psychological factors (Schofield and Cox, 2005). There are numerous studies in the literature dealing with the assessment of scenic beauty of natural landscapes (Habron, 1998; Van den Berg and Koole, 2006), rural landscapes (Arriaza et al., 2004; Rogge et al., 2007; Tilt et al., 2007), agricultural areas (Tveit, 2009; Vouligny et al., 2009), forests (Karjalainen and Komulainen, 1998; Ribe, 2005), rural-urban fringes (Kaplan et al., 2006, Sullivan and Lovell, 2006; Acar and Sakıcı, 2008), waterscapes (Ryan, 1998; Meitner, 2004; Yamashita, 2002; Bulut et al., 2010), parks (Müderrisoğlu and Demir, 2004; Wong and Domroes, 2005) and roadside vegetation (Clay and Smidt, 2004; Sezen and Yılmaz, 2010) from various geographies.

### **Cognitive parameters**

Scenic quality and cognitive parameters can be explained in a better way. The model of spatial information showed that several informational variables, such as mystery, coherence, legibility and complexity were used and investigated (Kaplan and Kaplan, 1989).

*Naturalness*: is one of the most effective characteristics on visual quality of the landscape. In the previous studies naturalness about visual quality and perceived naturalness influences people's aesthetic preferences as positive (Kaplan et al., 1972; Kaplan and Kaplan, 1989; Purcell and Lamb, 1998; Van den Berg et al., 1998; Simonic,

2003; Clay and Smidth, 2004; De La Fuente et al., 2006; Junker and Buchecker 2008; Bulut et al., 2010; Sezen and Yılmaz, 2010; Elinç and Polat, 2012; Polat, 2012).

*Coherence*: is related to the understanding of the environment and is the principal component in the interpretation of landscape structure. The coherence is the most powerful predictor of preference for these scenes (Simonic, 2003; De La Fuente et al., 2006; Polat and Önder, 2011). Planners and landscape architects can use these findings effectively. Broad landscape characteristic of coherence is an important element especially as much as the choice of place for the park, plant species, materials, structural form and function of the park.

*Vividness and being interesting*: proved to be a necessary component of a model to predict scenic beauty (Clay and Smidt, 2004). Vividness and being interesting had a significant relationship with preference in the visual quality of waterscapes (Bulut et al., 2010).

*Complexity*: According to Sevenant and Antrop (2010) complexity had no significant effect on landscape aesthetics in two latent preference classes but had a small positive effect in three preference classes.

*Mystery*: is another important broad landscape characteristic which may improve the design of park. Mysterious design or elements, which can be included in specific parts of a park, would contribute to the beauty of the park. The beauty of a park can be enhanced by making some additions to the design of an available park. For example, it is possible to succeed by placing artistic objects (sculptures).

*Familiarity*: 'Familiar' could be related to 'imageability', synonymous to 'sense of place' (Sevenant and Antrop, 2010). Place attachment is an area of research that seeks to understand the emotional and psychological connections between people and place (Walker and Ryan, 2008). Familiarity with landscape types and elements is another factor thought to influence landscape preferences (Kaplan and Kaplan, 1989; Tveit, 2009). Every landscape or place is compared to an individual's previous experiences of other places, both in terms of physical, environmental and social/cultural qualities (Walker and Ryan, 2008). Galindo and Hidalgo (2005) and Tveit (2009) studies have found that familiarity played an important role in aesthetic preferences.

## **Physiological parameters**

*Plants*: Previous studies related to visual quality assessment were carried out in dense vegetation. Areas that have particularly strong effects on the quality of the landscape of trees were determined (Sullivan and Lovell, 2006; Garré et al., 2009). The natural and biotype landscapes received high preference scores (Simonic, 2003). The natural features especially in rural landscapes yielded a rather positive effect on overall landscape quality (Kaplan et al., 2006). According to Bernasconi et al. (2009), trees and

lawns increase urban landscape quality significantly. Moreover, vegetation is quite an important factor for park visitors (Wong and Domroes, 2005).

*Water:* The water surfaces have a significant impact on a landscape's visual quality. Sea, lake, river and waterfalls are the primal factors include the element water. In the landscape planning and management studies, it is necessary to know the water's visual specialties and to estimate the landscape factors include water in terms of beauty of scene. There are numerous studies, which prove that the water factor increases visual quality in the landscape (Simonic, 2003; Arriaza et al., 2004; Dramstad et al., 2006). The factor of water has positive relation in preferences (Arriaza et al., 2004). Dramstad et al. (2006) detected that landscape photographs, which include water, are more preferable compared to those which include not. Acar et al. (2006) detected that water has positive relation with mobility and there was a negative relation between human made structures and visual quality. In a rural area of Japan, Yamashita (2002) found that water in the landscape strongly attracts the attention of child residents, whereas it plays a minor role in adult perception of the landscape. Images of containing water were significantly more preferred than those without water and this applied both for students and for locals (Dramstad et al., 2006; Walker and Ryan, 2008).

*Topographic variation:* These patterns of vegetation, possibly combined with topographic variation, caused a general positive response (Dramstad et al., 2006). Rocky habitats with important plant diversity and visual quality must be evaluated as a part of urban open green areas and these habitats must contribute to these areas as aesthetical and functional matters (Acar and Sakıcı, 2008). Residents often referred to the mountains and to what they considered as natural, such as forests and water courses (Voulligny, 2009). The perceived visual quality increased with the percent of visible vegetation, water views, and presence of mountains on the horizon (Arriaza et al., 2004; Bulut and Yılmaz, 2007).

## **Demographic parameters**

Visual preferences of users depend on various variables. In evaluation studies about aesthetic preferences, relation between landscape and demographic qualities of detectors is a significant issue to be analyzed (Sevenant and Antrop, 2009). It is stated that demographic qualities such as age, settlement place, education level are quite important on aesthetic preferences of people and their environmental values (Junker and Buchecker, 2008). According to Kaplan et al. (1998), locals and tourists (foreigners) can perceive the same landscape in different perspective.

Elinç and Polat (2011) found statistically significant results between visual quality of parks and age, educational status and settlement status of park users. It was determined that among participants the group including young people and university graduate participant appreciated visuality of parks compared to those in other age groups and those at other educational status respectively. Polat et al. (2011) detected that in the sense of gender, visual quality scores differ in areas, which have plant density.

## Conclusion

The common objective of visual quality assessment studies is to develop visual criteria and modeling processes, which can be used in planning, and design processes and expand the environmental sequence required for environment protection and development.

In landscape resource analysis studies several natural and cultural features are taken as basis. One of the most prominent of these features is visual quality value. Landscape scene beauty is needed to accept as natural resource value. In this situation, it is very important to calculate and form the potentials of these values for the analysis of landscape character and quality. For related analysis, it is necessary to take landscape scene beauty as one of the sub-elements. There can be some benefits from landscape scene beauty in landscape protection and management fields. This situation should not be disregarded for sustainable ecological plans.

In urban areas special care should be paid for green areas are located inside urban areas. This situation should also be assessed from urban park perspective. Especially, the parks which will be formed adjacent to natural landscape and cultural landscape will bear higher values from visual quality point of view. The reason is that these areas can also form very good background views for the parks.

The landscape's scene beauty with existence of recreational activities affects the tourists' recreational experiences and redoubles the territories' recreational value as a result. That's why an increase in economic value of many natural areas is seen (Tahvanainen et al., 2001; Othman, 2011). The landscapes not only make contribution to rural character as an open space from forest to agricultural lands, but also take an important role in rural economy (Walker and Ryan, 2008). The important benefits of natural areas are usually related to recreational and social activities, but some studies showed it is possible to afford noteworthy psychological benefits from the passive relation between human and nature which depends the visual pleasure of human about nature. The psychological studies about visual environment explain that natural scene has curative effects on human emotional states by making changes positively (Özgüner and Kendle, 2006).

The main component of the natural environment from tourism and recreational perspective is visual or view quality. Landscapes which are important for the view are not only beneficial for the individuals. They significantly contribute to the attractiveness of the area; therefore, they can be correlated to financial benefits of the region (Clay and Daniel, 2000).

In visual sense, the most important benefit of high urban landscape on people is improvements on spirit and health. The most important perception of people is in visual sense. Visual quality of urban environment is the most important factor which increase physical,



Studies to be carried out on demographic studies would present urban regression of a specific area and user profiles for other landscape areas. These findings would be important ground for planners and managers.

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