Determination of landscape beauties through visual quality assessment method: a case study for Kemaliye (Erzincan/Turkey)

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Abstract Kemaliye (Erzincan/Turkey) is the member of European Association of Historic Towns and Regions. The aim of this study was to reveal the visual richness of the town; to identify the relationship between landscape spatial pattern and visual quality of the landscape and to offer some suggestions for the future planning in regarding to these visual beauties. The visual quality assessment method was used in this study. The results of the study revealed three landscape types that have the highest visual quality. Among those, the highest one is urban scenery 3 (US3; VQP=5.9400), the second is geological structure scenery 5 (GSS 5; VQP=5.9200) and the third natural scenery 3 (NS3; VQP=5.9133). Visual quality assessment showed that urban pattern, geological structure and natural resources of the region also have visual value. The relationships between landscape spatial pattern and visual quality of landscape indicated that certain characteristics of landscape affected the quality. For instance, as the texture level decreased in natural landscapes and as the green areas increased in geological structure, visual preferences ratio increased. Some suggestions were also made regarding the visual resources use in the region.

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Introduction

As a result of rapid and unplanned urbanization, people had to live in places far away from green places and places with lots of buildings. Since people like nature, they prefer recreational tourism areas to rest and have fun. The attractiveness of recreational areas are directly associated with the richness of visual, natural and cultural resources. In today's world, the examination of visual characteristics of areas is important in recreational planning studies. The visual landscape is very important in human's life (Lambe 1986).

Visual elements of landscape not only present aesthetical values but also verify the mutual relationships of these values in cultural, economic and biological dimensions (Daniel and Vining 1983; Amir and Gidalizon 1990; Angileri and Toccolini 1993). Today, visual quality assessment has become more important in gathering data to be used in planning studies. The aims of visual quality assessment are to help to determine and list the areas to be protected with the framework of cultural heritage protection program; to determine whether a landscape is aesthetically appropriate or not; to define and determine certain factors and physical landscape components that affect the preferences for this particular area (Kane 1981).

Visual landscapes should be considered important natural resources just like water, soil, mines and fossil fuels (Kane 1981). In order to endure the development and protection of natural and cultural structure, it is necessary to define landscape structure and carry out some analyses regarding visual importance (Krause 2001).

Daniel and Boster (1976), Patey and Evans (1979), Brown and Daniel (1984, 1986), Hull and Buhyoff (1986), Hull et al. (1987) and Ribe (1990), in their visual quality assessments, used the photographs and slides of a particular landscape, which were evaluated by the participants (Bergen et al. 1995). Later, they worked on the relationship between the results and the characteristics of the landscape (Bergen et al. 1995).

Visually attractive resources are valuable recreational resources of an area. Most of the recent studies made use of visual quality assessment and presented some visually preferred places (Shafer and Brush 1977; Shuttleworth 1980a, b; Schroeder and Daniel 1980; Hull and McCarthy 1988; Kaplan et al. 1989; Hull and Stewart 1992; Angileri and Toccolini 1993; Van den Berg and Koole 2006; Roth 2006).

Visual quality assessment in which landscapes were evaluated by the participants were applied for different types of landscapes in the following studies: forest landscapes (Hammitt et al. 1994; Ribe 1994; Bergen et al. 1995; Sheppard and Picard 2005); national parks (Yu 1995; Acar et al. 2006); World Heritage areas (Kaltenborn and Bjerke 2002, areas where ecological rehabilitation were applied Hands and Brown 2002); agricultural landscapes (Arriaza et al. 2004); canyons Meitner 2004); rural–urban fringes (Sullivan and Lovell 2006); urban landscapes (Müderrisoğlu et al. 2006); highway landscapes Lambe 1986; Mok et al. 2005); visual quality of vegetation types(Ulrich 1986; Tzolova 1995; Misgav 2000), agricultural landscapes (Tahvanainen et al. 2002); and different landscapes (De Val et al. 2006; Karjalainen and Komulainen 1999; Van den Berg and Koole 2006). On the other hand, several similar studies on visual quality assessment have been done by some Turkish researchers. Acar and Kurdoğlu (2005) and Acar et al. (2006) analyzed visual quality assessment for the Kaçkar Mountains National Park and Karahan (2003), Karahan and Yılmaz (2004a) and Karahan and Yılmaz (2004b) for Erzurum-Rize highway corridor.

The aims of this study were as follows: (1) to determine the visually quality areas and natural beauties of Kemaliye town and nearby, which is an outstanding area with natural and cultural values, (2) to explore the relationships between landscape spatial pattern and visual quality of the landscape, (3) to offer suggestions for future planning studies in regarding to the use of resources.

Materials and methods

The area in focus in this study is Kemaliye town and nearby. This town is located in Erzincan, a district in northwest part of East Anatolia Region in Turkey. It is located in 39°15″00′ northern latitudes and 38°30″00′ eastern longitudes with an altitude of 950 m (Anonim 2005a) and an area of 1,007 km^2 (Anonim 2005b; Fig. 1).

### The analysis of visual resources values of the area

The most common method used for visual quality assessment is The Scenic Beauty Estimation Method-SBE, developed by Daniel and Boster 1976 (Bergen et al. 1995). Visual quality assessment applied in this study is based on the following studies: Daniel and Boster 1976 (Bergen et al. 1995); Kane (1981); Bergen et al. (1995); Daniel (2001); Hands and Brown (2002), Meitner (2004); Clay and Smidt (2004), Arriaza et al. (2004) and Acar et al. (2006). The following procedure is applied in the visual quality method used in this study.

The selection of the photographs for visual quality assessment

This selection aims at bringing all the photographs representing the study area. Among the 500 photographs taken some randomly selected ones were grouped according to landscape types and natural and cultural features. Seven landscape types were determined and five photographs for each type were evaluated. 35 photographs chosen. These landscape types are:

1. Natural Scenery
2. Urban Scenery
3. Geological Structure Scenery
4. Scenery of Flora
5. Valley Scenery
6. Dam Scenery
7. Authentic Scenery

Fig. 1 Location of Kemaliye (Erzincan) in Turkey
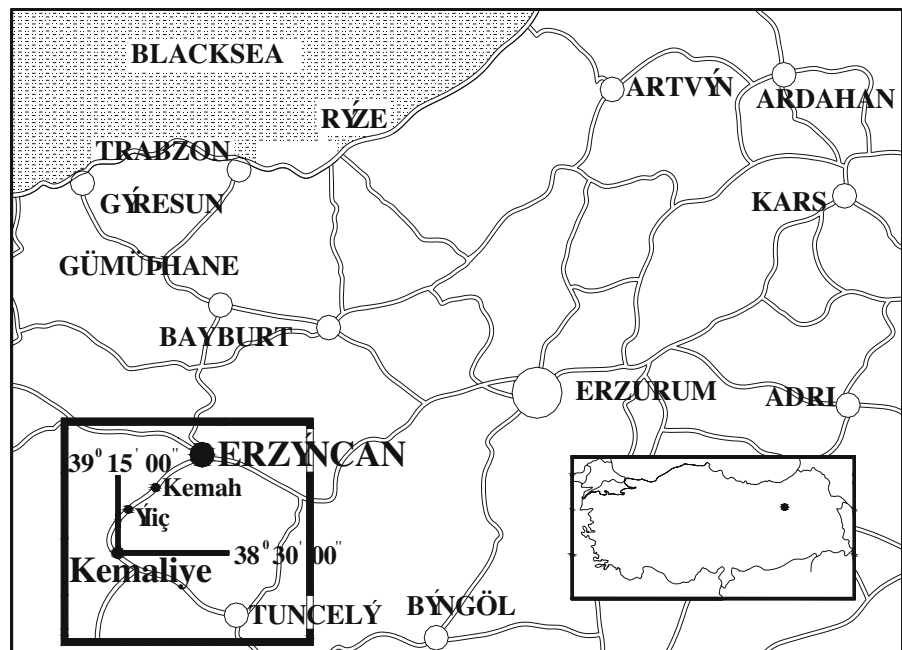
The investigation of visual quality

The participants of the analysis: third ($n=25$) and fourth ($n=21$) year students of the Department of Landscape Architecture, the students ($n=32$) of Department of Horticulture; the students ($n=22$) of Faculty of Fine Arts and local residents ($n=50$). A total 150 participants were answered the questionnaire. A presentation was prepared to give information about Kemaliye and nearby to the participants. This presentation also aimed at introducing the various landscape types of the study area and at helping them to create their own criteria before the evaluation process. Later on, the photographs were shown to the participants via visual quality assessment presentation. In the questionnaire, the participants were asked to evaluate the photographs.

The participants were informed about landscape parameters. The evaluation was made by using 7-point scale for each photograph for each of the following features: vividness, landscape variety, harmony, naturalness, being interesting, impressiveness, originality, mystery and historical value. In this 7-point scale 1 point was the lowest and seven was the highest. The participants were also told that they should focus on the area rather than on the quality of the photograph.

The evaluation of visual landscape characteristics

The studies based on visual quality assessment show that visual quality can also be evaluated through the analysis of landscape characteristics. In this study the mutual relationships between the data obtained through the evaluation of landscape elements and the data from the visual quality assessment were examined by using correlation test (Arriaza et al. 2004; Acar et al. 2006).

For this evaluation, a total of 35 photographs were evaluated in terms of landscape characteristics and landscape attributes and elements. The Table 1 shows the scale of measurement of landscape elements (Arriaza et al. 2004; Acar et al. 2006).

According to the criteria listed above, the photographs were presented to the experts in the Department of Landscape Architecture as a PowerPoint presentation and they were asked to evaluate these photographs.

Statistical analysis

The SPSS 10.0 statistics program was used for statistical analyses. The averages were calculated and correlations were performed using the non-parametric rank test.

Table 1 Scale of measurement of landscape elements

Variable	Abbreviation	Scoring			
		1	2	3	4
Vegetation					
Percentage of area covered by vegetation	PV	%0–25	%25–50	%50–75	%75–100
Type of vegetation	TV	No vegetation or unclear	Grass, herbaceous and bushes	Mix vegetation (Bush + tree)	Trees
Topography					
Type of topography	TT	Almost flat	Wavy	Mountain	Very mountain
Naturalness					
Degree of naturalness	DN	Houses + roads etc.	Man made elements are dominant	Semi natural	Natural
Water resources					
Type of water resources	TWR	None	River	Lake	Dam Lake
Water movement	WM	None	Inactive	Active	
Man-made elements					
Presence of positive man-made elements (sights and typical houses)	PME	None	1 element	2 elements	3 or more elements
Percentage of positive man-made elements (sights and typical houses)	PPME	0–25%	25–50%	50–75%	75–100%
Presence of negative man-made elements (roads, industries, power lines, etc.)	NME	None	1 element	2 elements	3 or more elements
Percentage of negative man-made elements (roads, industries, power lines, etc.)	PNME	0–25%	25–50%	50–75%	75–100%
Texture					
Type of Dominant Texture	TDT	Smooth	Medium	Rough	–
Sky					
Percentage of sky area	PSA	0–25%	25–50%	50–75%	75–100%
Colour					
Colour diversty	CD	One colour	Two colours	3 or more colours	

Results

Table 2 shows the averages of visual preferences grades for each landscape type in an order from the highest to the lowest. Among those, the highest one is urban scenery 3 (US3; VQP=5.9400), the second is geological structure scenery 5 (GSS5; VQP=5.9200) and the third natural scenery 3 (NS3; VQP=5.9133; Fig. 2).

Among urban sceneries, the highest visual quality point is the US3. The parameter with the highest point for US3 is scenery variety (5.8333). Of the geographical sceneries, the highest visual preference point belongs to GSS5. The highest parameter for GSS5 is "naturalness" (mean, 5.7800). Of the natural sceneries, the scenery with the highest visual preference point is NS3. The highest parameter point for this scenery is vividness (mean, 5.9467). Of the authentic sceneries, the scenery with the highest visual preference point is AS5 and the highest parameter is "historical value" (mean, 6.0867). Of the sceneries of flora, highest visual preference point is FS5 and the parameter with the highest point is vividness (mean, 5.8600). Among valley sceneries, highest visual preference point is VS3 and the parameter with the

Table 2 The averages of visual preferences grades for each landscape type (Fig. 2)

Graduaded of visual quality	Sceneries have the highest visual quality point in the scenery types	Avarage visual quality point
1	Urban Scenery 3 (US3)	5.9400
2	Geological Structure Scenery 5 (GSS5)	5.9200
3	Natural scenery 3 (NS3)	5.9133
4	Authentic Scenery 5 (AS5)	5.9067
5	Flora Scenery (FS5)	5.8867
6	Valley Scenery 3 (VS3)	5.8267
7	Dam Scenery 4 (DS4)	5.7733

highest point is vividness (mean, 5.7000). Of the dam sceneries, highest visual preference point is DS4 and the parameter with the highest point is naturalness (mean, 5.5467).

These results show that vividness, naturalness and landscape variety parameters received the highest points in "landscape type" category. On the other hand, "historical value" received the highest point for authentic sceneries. It was found that these sceneries had also the highest visual quality points.

The relationship between visual preference points and semantic parameters

Statistically significant and positive relationships were found between visual preference points for landscape types (US3VQ, GSS5VQ, NS3VQ, FS5VQ, VS3VQ, DS4VQ, AS5VQ) and semantic parameters, which are vividness, variety, harmony, naturalness, being interesting, impressiveness, authenticity, mystery and historical value ($p<0.01$).

The following parameters affected the visual preference point most: vividness in US3 scenery ($r=0.714$), GSS5 scenery ($r=0.647$), NS3 scenery ($r=0.667$), FS5 scenery ($r=0.705$), VS3 scenery ($r=0.688$), and DS4 scenery ($r=0.758$). Similarly, originality affected the visual preference point in AS5 ($r=0.683$; the tabular findings of correlation analysis could not be given due to large cover paging).

Analysis of the relationships between landscape types, visual preference points and landscape attributes

Within the framework of this study, there are seven landscape types (natural, urban, geological, flora, valley, dam and authentic scenery) and eight main and seven sub characteristics for each landscape type. The relationships between landscape attributes, and visual preference points were examined using the Spearman's correlation test. According to this analysis; no relationship was found between landscape parameters and the visual preference points given to urban, vegetation, valley, dam and authentic sceneries. On the other hand a negative relationship was found ($r=-0.889$, $p<0.05$) between dominant texture, which is landscape attribute and visual preference point given for natural sceneries (Table 3). In other words visual preference point increased as texture level decreased. No relationship was found for natural scenery and the other parameters. In addition, a positive relationship was found between visual preference points of geographical scenery and green areas ($r=0.894$ $p<0.05$). In other words, visual preference points increased as the percentage of area covered by vegetation increased. No relationship was found for geographical scenery and the other parameters.

Similar studies conducted revealed the following results: there is a positive relationship between visual preference point and type of water resources and water movement; there is a negative relationship between visual preference and the percentage of the area covered by waterfall, types of cultural elements, the percentage of the area covered by cultural elements, roads, clouds and color diversity (Acar et al. 2006). Also visual quality is positively affected by degree of naturalness, presence of well-organized cultural elements, percentage of green areas, amount of water, presence of mountain and color contrast (Arriaza et al. 2004). According to Hunziker and Kienast 1999), visual preference points are related to some landscape attributes (the distribution of green tones and color diversity).

Fig. 2 Sceneries with high visual quality
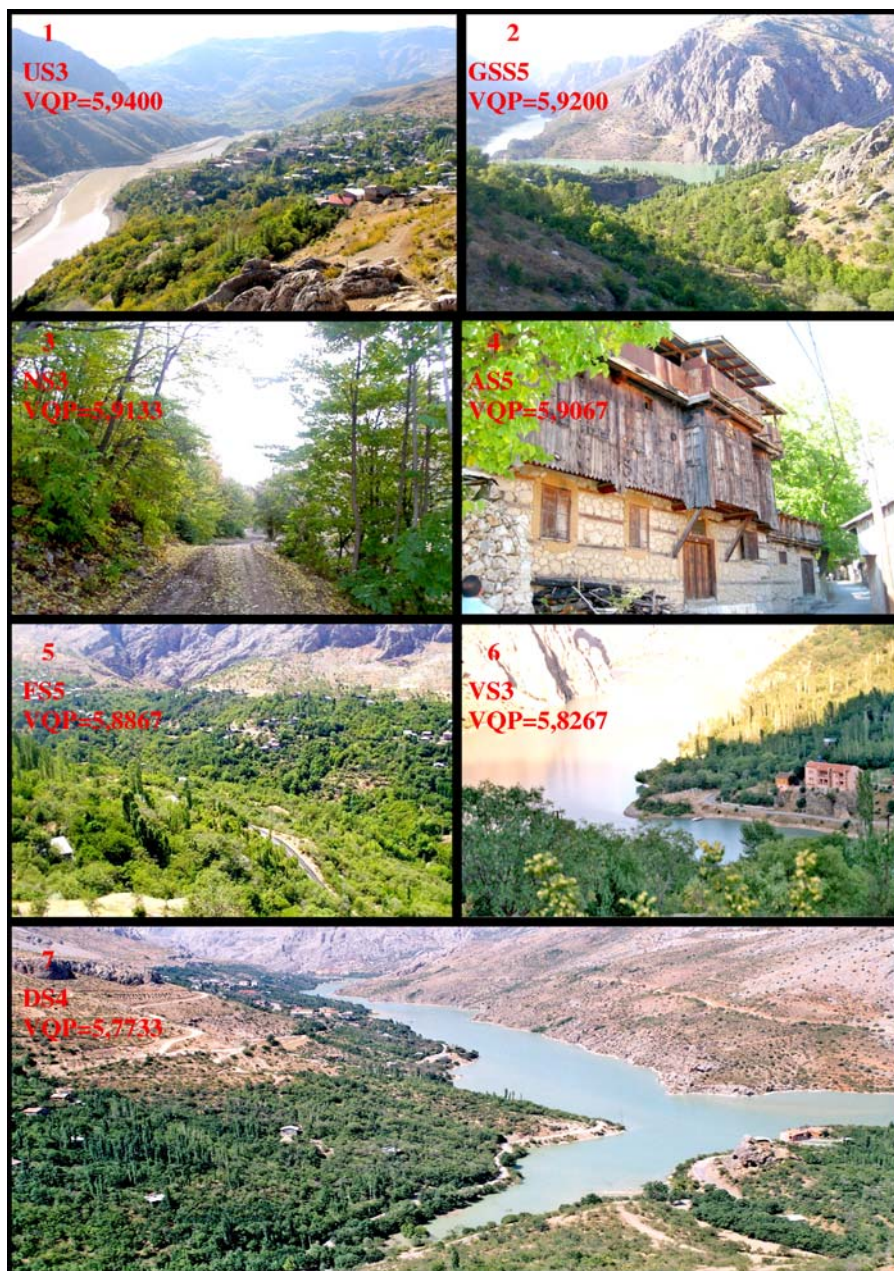
Discussion and conclusion

The visual quality analysis of the photographs taken from Kemaliye and its surroundings revealed the panoramic beauties of the region which in fact form the visual characteristics of this area either as a whole or in specific details.

Visual constituents of landscape also represent the relationship of aesthetical, cultural, economical and biological merits of a specific area (Angileri and Toccolini 1993). Therefore, landscape is defined as "the unity of a number of natural and cultural elements of a specific view" (Koç and Şahin 1999). Considering these views, quality landscape types in terms of visual quality are found in this study done in the town Kemaliye and its surrounding.

During the walks in the research field, in the sense of visual quality, highly attractive and eye-catching

Table 3 The relationships between landscape types, visual preference points and landscape attributes

Landscape attributes and elements	Visual preferences of landscape types						
	Visual preference point of natural scenery (VPPNS)	Visual preference point of urban scenery (VPPUS)	Visual preference point of geological structure scenery (VPPGSS)	Visual preference point of flora scenery (VPPFS)	Visual preference point of valley scenery (VPPVS)	Visual preference point of dam scenery (VPPDS)	Visual preference point of authentic scenery (VPPAS)
Percentage of area covered by vegetation	0.289	0.000	0.894	0.632	0.707	0.447	–
Type of vegetation	0.000	–	0.632	0.000	0.866	0.577	0.224
Type of topography	−0.592	–	−0.707	−0.447	0.707	0.000	–
Degree of naturalness	0.592	−0.289	0.707	−0.112	-0.707	−0.154	–
Type of water resources	−0.162	−0.707	–	−0.354	–	–	−0.707
Woter movement	−0.108	−0.707	–	−0.354	0.707	–	−0.707
Presence of positive man-made elements	0.344	0.354	0.783	0.577	−0.577	0.577	0.000
Percentage of positive man-made elements (sigths and typical houses)	0.363	0.289	0.354	–	–	–	−0.447
Presence of negative man-made elements	−0.544	−0.289	−0.354	0.000	0.447	−0.447	−0.369
Percentage of negative man-made elements (roads, industries, power lines, etc.)	–	–	–	–	–	−0.354	–
Type of dominant texture	−0.889*	−0.289	−0.866	0.224	0.105	−0.289	–
Percentage of sky area	0.444	–	–	0.000	−0.783	−0.866	−0.289
Colour diversity	−0.433	–	0.866	0.000	−0.707	0.354	0.158

*Correlation is significant at the 05 level (2-tailed)

landscape scenes were noticed. Those were natural, semi-natural and cultural merits of the area. Finally, the results of the study revealed three landscape types that have the highest visual quality. Among those, the highest one is urban scenery 3 (US3; VQP=5.9400), the second is geological structure scenery 5 (GSS5; VQP=5.9200) and the third natural scenery 3 (NS3; VQP=5.9133). The visual quality assessment showed that urban pattern, geological structure and natural resources of the region also have visual value. Also in similar studies (Hammitt et al. 1994; Hull and McCarthy 1988) the relationships between landscape spatial pattern and visual quality of landscape were examined. For instance, as the texture level decreased in natural landscapes and as the green areas increased in geological structure, visual preferences

ratio increased. The same finding was also underlined by Wherrett (2000) in a similar study in which mountain and water views were found to have significant importance in landscape preferences.

In the study, it is underlined that the urban scenery 3 (US3) displays the cultural merits while the geological structure scenery 5 (GSS5) and the natural scenery 3 (NS3) display the natural merits of the town. The town Kemaliye has quite an authentic urban identity with its traditional houses, streets and unique natural beauties. Thus, the best place in terms of visual quality was found to be the urban area in Kemaliye which was scored as the highest among the others (VQP=5.9400). In other words, in the research field, the urban scenery 3 (US3) was chosen to have the most attractive quality with the view of traditional

houses each having a distinguished place in the overall view of the town by its traditional architecture and cultural qualities.

Having a vast biological diversity and a traditional house architecture which are harmonious with the natural and cultural scenic beauties, Kemaliye and its surrounding promise the researchers and future visitors a number of touching attractions. Considering the importance of those natural and cultural merits, the following are proposed for a better advertisement campaign for tourists and an attentive protection of the area:

1. The visual resources have to be preserved and used for the future planning of the area.
2. The visual resources should be considered as ecological and economical values for the future tourism activities and should never be drifted apart from the natural and cultural values.
3. Those visual resources should be managed taking the stability between natural and cultural resources on one hand; social, ecological and physical carrying capacity on the other hand into account.

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