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Assessing the visual quality of forest park landscapes: A case study of the Barajin park in Qazvin's suburb area, Iran

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Abstract

The visual assessment of forest park landscapes is of great importance for planning their design, organization, conservation and management. In this study, the visual quality of Barajin Forest Park located in the suburban area of Qazvin, Iran, has been examined based on the conceptual framework developed by Tveit et al. Seven visual criteria of sense of order, coherence, disturbance, visibility, imageability, diversity, and naturalness were assessed using an online survey with photography representation. Collected data from respondents were coded and analyzed using SPSS into Expert and Non-expert respondents. Results show that naturalness, coherence, visibility, and imageability were the most important parameters of visual quality. Little difference was found between the perceptions of Experts and Non-experts. These results highlight the importance of including visual landscape metrics in planning and management of urban forest parks for optimizing visitor experience and ensuring ecological sustainability. By applying the Tveit et al. framework to a non-European context (Iran), this study tests its international relevance. Key outcomes indicate a strong convergence between expert and public perceptions, and highlight the critical role of 'naturalness' as an indicator in a comparatively dry suburban park.

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Introduction

Forest parks, whether natural or man-made, are often located within urban areas. They play an important role in maintaining biodiversity and sustainability. These parks can serve as excellent recreational destinations for the local people besides offering environmental, conservation, learning and research roles (Majnonian, 1979). Multifunctional forest landscapes require several different forest management systems and landscape planning. This requires learning about multiple forest values, and different forest owners' and users' preferences (Angelstam & Dawson, 2025).

The visual appeal of a city forest park—its structure, vegetation, and landscape expression—is a major factor in its selection as a recreational area. Landscape could be viewed as the paramount element in the process of determining the identities, liveliness, and sustainability of the environment, and in the exchange of communication between the environment and its users (Golchin et al, 2013). Understanding the recreational quality of green spaces and visitors' behaviors and preferences is essential for effective forest park conservation strategy (Chen & Qi, 2018).

To date, the visual elements of landscapes have been evaluated by experts (Kaplan, Kaplan, & Brown, 1989; Lothian, 1999; Zube, Sell, & Taylor, 1982). The assessment of the visual quality of a landscape can be carried out based on two strategies, which include objective and subjective perception: within the objective strategy, the assessment is carried out by experts based on objective and physical parameters of the landscape and based on a numerical evaluation system. The subjective approach takes into account the preferences of citizens and the visual experience, which also depends on the memories, associations of meanings, concerns of citizens and the perception of space by citizens (Lothian, 1999).

Two of these methods of assessing the quality of the environment, the expert (professional) and the consumer preference methods are most important and mainly used (Zube, Sell, & Taylor, 1982& Daniel, Vining, 1983). In

evaluative models, valuation involves visual, auditory, and emotional components, and is conducted within categories of natural beauty in the landscape. In making appraisals concerning the preferences of people, the considerations of beauty being in the minds of the beholder are critical and valuation is according to aesthetic sentiments and aspect of the landscape by the people (Naroei, Yal, 2021). There are many works devoted to the evaluation of visual landscape quality, including studies by Arthur et al. (1977), Ribe (1994), Hammitt et al. (1994), Arriaza et al. (2004), Daniel (2001), Kaplan et al. (1989), Lothian (1999), Zube et al. (1982), and Tveit et al. (2006).

Although the scientific assessment of landscapes is an established field, much of this work has focused on pristine natural environments or densely vegetated urban parks. This has resulted in a significant and persistent blind spot in our understanding of the visual quality of suburban forest parks. This gap is particularly evident in the culturally and geographically distinct environments of the Middle East. The aim of this research is to directly address this neglect by conducting a focused study of Barajin Park, a key suburban forest located on the outskirts of Qazvin, Iran.

Material and methods

Pilot area

The capital of the province of Qazvin, northwest Iran, was a former capital of Iran during the Safavid period. Barajin Forest Park is located to the northeast of Qazvin and south of the Alborz Mountains (Figure 1). The climate of Qazvin is generally dry and comparatively cold (Shakeri et al., 2024). Being one of the pleasant climate and recreation places of Qazvin, it entertains citizens and tourists in different seasons of the year, especially spring and summer. This park is located a short distance from the city and contains numerous facilities and services, including a lawn, a cycling track, summer cinema, a playground, various water features, a gazebo and camping for travelers, a nature village (zoo), an ecotourism (tourist hotel), an artificial lake, a parking lot, a reception hall, and a store, among others.

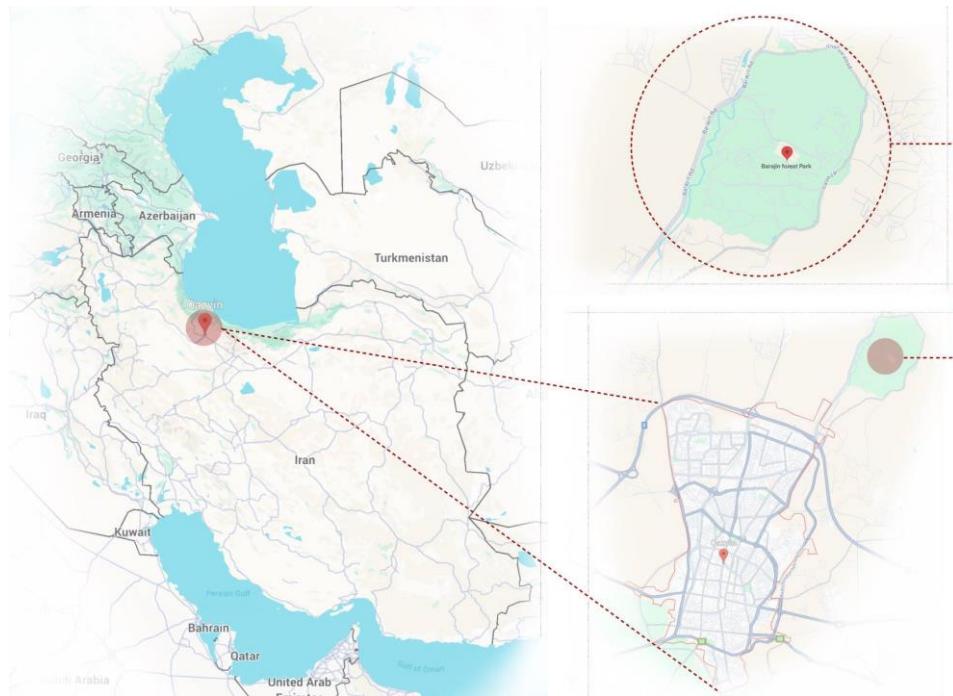


Figure 1. The study area. *Source:* Based on www.googlemap.com

Visual documentation

Because pictures could be considered a possibly appropriate criterion for visual assessments and are also based on several studies which had been directed towards the visual quality of landscapes, here the photography tools used for the assessment of the forest park landscapes (Daniel & Meitner, 2001; Law & Zube, 1983; Pérez, 2002; Rogge, Nevens, & Gulinck, 2007; Wherrett, 2000). The questionnaire images used here contained 12 images indicating forest park

landscapes. (Figure 2). These images were chosen from 35 photos taken by the author in 2025.

Photo matching was done with observations at the indicated conditions and with the reality of the real place so that only those photos that were adequate could be chosen as the final images for the indicators. Such photographs were in color taken at eye levels, also, those taken from respective distances to be able to capture what is to be really emphasized in the subject of the photograph.



Photo (1)

Photo (2)



Photo (3)

Photo (4)

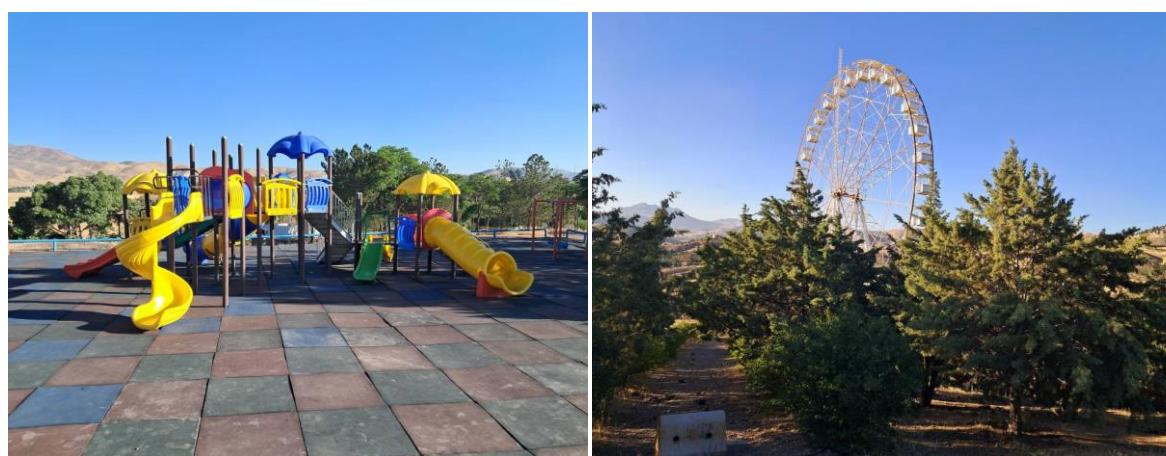


Photo (5)

Photo (6)

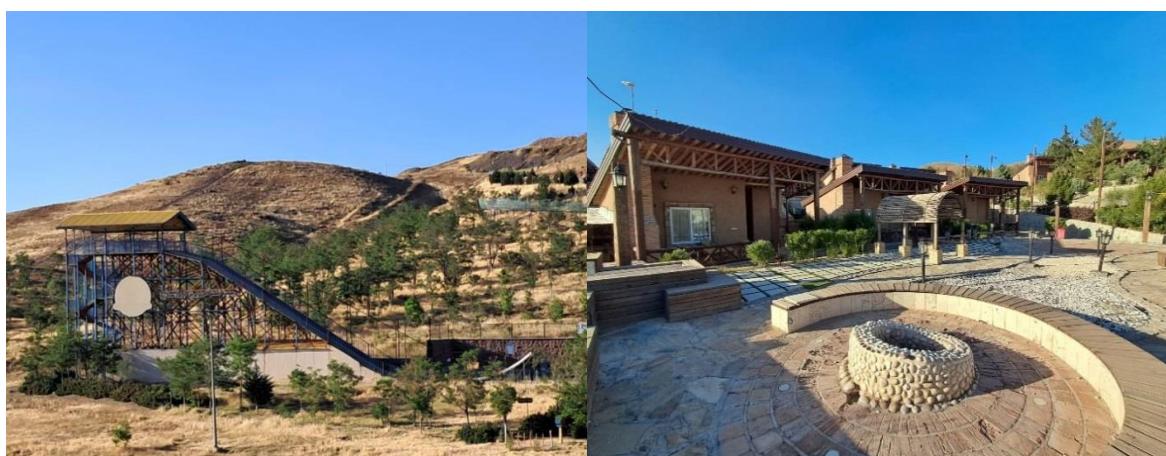


Photo (7)

Photo (8)

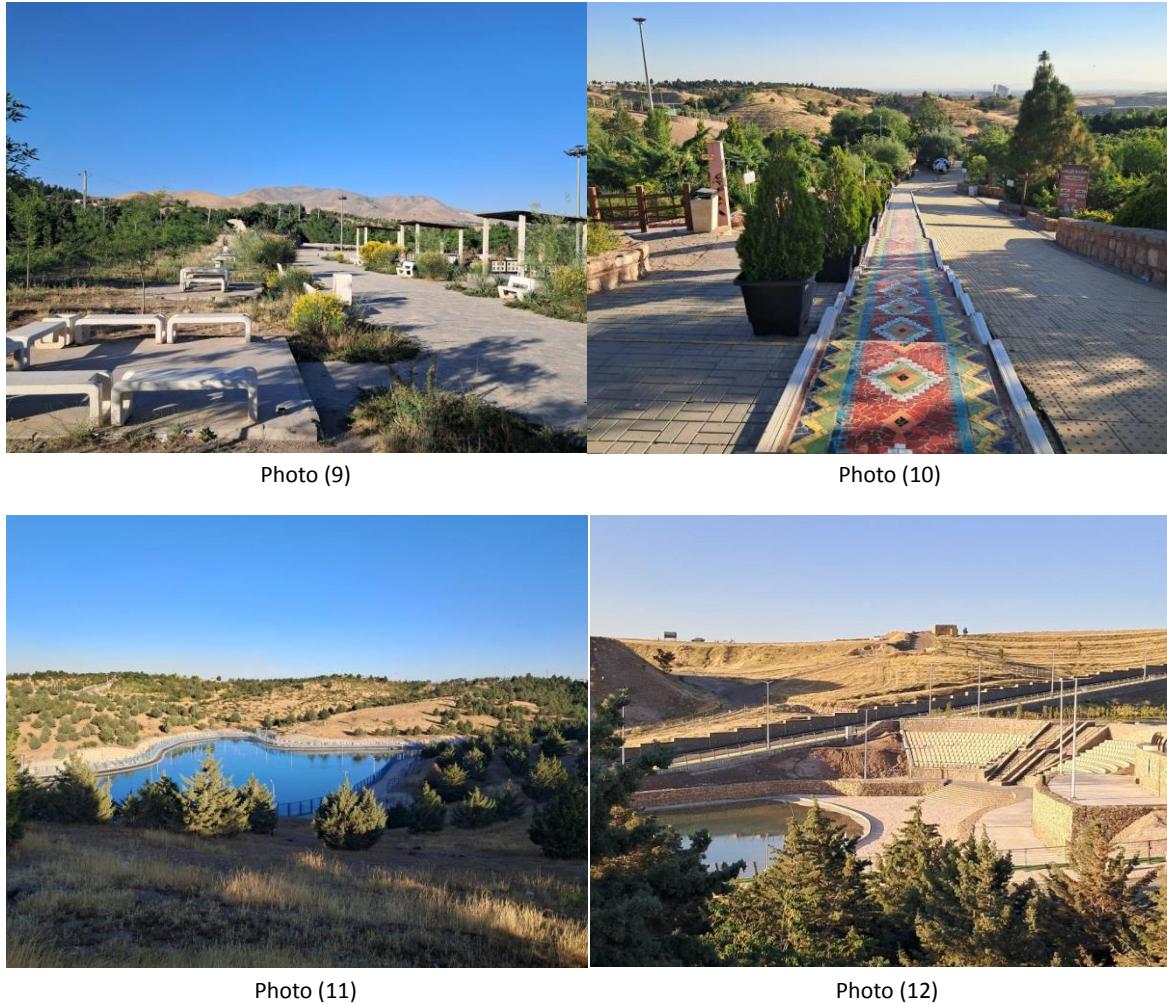


Figure 2. Photographs used in the query. Source: photo by the author.

Variables

A considerable amount of research has been conducted in the last few decades about visual feature analysis for landscape assessment. In their literature review, Tveit et al. (2006) compiled the different aspects of landscape aesthetics, visual concepts and landscape preferences into rural categories and have devised a framework around nine basic visual concepts for visual feature analysis: Set, Stewardship, Coherence, Disturbance, Historicity, Visual scale, Imageability, Complexity, Naturalness and Ephemera (Tveit et al, 2006).

In the meantime, since a better understanding

in the measurement process required the opinions of other experts in this area, it was found justifiable to use synonyms for these concepts and indicators and remove some indicators. Stewardship could also have Sense of order as its synonym. The equivalent of Visual scale could be Visibility (Bell, 1999). The word Diversity can be used instead of Complexity (Angileri & Toccolini, 1993).

In this study, visual quality acts as dependent variable while 7 indicators Sense of order, Coherence, Disturbance, Visibility, Imageability, Diversity and Naturalness are considered independent variables (Table 1).

Table 1. Effective visual concepts in landscape assessment, developed by Tveit et al. (2006) and their equivalents

concepts	Description
Sense of order	A sense of order helps to get closer to the "ideal" state.
Coherence	Coherence in terms of an ordered structure that we can understand, and where comprehension of the whole is more significant than the individual parts. This is a feature of all natural or cultural, self-organized, planned or designed landscapes (Bell, 1999).
Disturbance	Disturbance was considered a lack of proportion and unity. Disorder is related to inappropriate interventions that occur in the landscape.
Visibility	Visibility reflects the experience of perspective, sight, and openness.
Imageability	Imageability is a feature of a landscape in which specific features and characteristics cause the landscape to create a strong visual image in the viewer and make the scenery memorable and distinctive.
Diversity	Diversity is defined as the variety and richness of landscape elements and features, with different scales and layers.
Naturalness	Naturalness is defined as proximity to a predetermined natural state.

The decision to refine the original framework by Tveit et al. into a focused set of seven indicators was both deliberate and methodologically driven. This adaptation served a critical purpose: to enhance the instrument's clarity and accessibility for a non-specialist audience while rigorously preserving its theoretical integrity. A prime example of this refinement is the conceptual shift from "complexity" to "diversity." Findings from our pilot studies indicated that "diversity" was a more intuitive and cognitively accessible construct for lay respondents. This terminological change successfully bridged the gap between academic theory and public understanding, as it retained the essential conceptual meaning pertaining to the variety of landscape elements.

Query and Respondents

In this study, the researchers conducted a survey by sending a link to a questionnaire using a web-based application called Porsline. Respondents were asked first about

their gender, age, educational level, and whether their education is connected to architecture and/or urban planning. Following this, images were shown depicting views of the forest park. The next stage presented 13 questions based on the 7 indicators related to landscape visual quality assessment. For some indicators, one question was administered, while for some others, up to four questions were administered. The answer sheet was designed on a five-point Likert scale in which "1" means very low and "5" means very high. The respondents were not timed for answering. Out of 546 people who received the questionnaire, 203 responded (including 96 women and 107 men).

Accordingly, the respondents were divided into two groups:

Expert Group (n = 72): Those holding a bachelor's degree or higher in architecture or urban planning.

Non-expert Group (n = 131) (Table 2).

Table 2. Interviewee's characteristics

Gender	Male Female
Age	<20 21–40 41–60 ≥61
Educational Level	High school Diploma Undergraduate and graduate student Undergraduate and postgraduate student PhD student and PhD 72
Expert	131
Non-expert	

Statistical methods

In all, there were seven indicators summed and modified for assessment of the visual quality of the landscape, from Tuite et al. (2006). Thereafter, 13 questions relating to these seven indicators were prepared and included in the questionnaire. The questionnaire for the present study was analyzed using SPSS software version 22.

Thus, the dependent variable (Visual Quality) along with the independent variables (seven indicators mentioned) representing independent variables were taken into consideration. The first step was to assess the visual indices after which regression analysis was conducted, followed by descriptive statistics calculations. There was no missing data. The responses of the two respondent groups (Expert group and Non-expert group) were analyzed with the use of a very close T-test.

A total of 203 numbered questionnaires were thus distributed and analyzed, for greater certainty, and in anticipation of possible dropout. Excel was used for the averaging of scores related to each indicator, later feeding the data into SPSS software.

For easier understanding and accelerating the responses from the respondents, the response variables were measured according to a five-point Likert scale. The Alpha Cronbach value was about 0.7 making the questionnaire

developed in the present study reliable (Table 3).

Normality was also checked and confirmed. Then the regression was carried out with the help of the variance inflation factor (VIF), and the analysis was done on independent variables, their extent to explain the dependent variable, and a comparison of the two groups of Experts and Non-experts.

Results

Regression analysis and Comparison of two target groups

Regression analysis applied the Variance Inflation Factors (VIF). An Adjusted R Square coefficient value of 0.974 indicates that the independent variables explain the dependent variable well. From observed VIF coefficients ranging between 1 and 2, the variable Diversity with a VIF of 1.858 was omitted to satisfy the tests, indicating a weak collinearity between the variables.

Comparison of the two groups of Experts and Non-experts shows that there is slightly differing opinions between the two groups, however almost the same opinion prevails (Table 4). By looking into the Beta values, it is clear the variables Coherence, Naturalness, and Visibility play the most important role in explaining the dependent variable (visual quality) in that order (Table 8).

Table 3. Reliability Statistics

Cronbach's Alpha	N of Items
.752	7

Table 4. Group Statistics (T-test)

Expert/ Non-expert	N	Mean	Std. Deviation	Std. Error Mean
Expert	72	3.0605	.56178	.06621
Non-expert	131	2.9836	.56381	.04926

Table 5. Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	Naturalness, Disturbance, Visibility, Coherence, Imageability, Sense of Order	.	Enter

a. Dependent Variable: Visual_Quality

b. All requested variables entered.

Table 6. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.987 ^a	.975	.974	.09045

a. Predictors: (Constant), Naturalness, Disturbance, Visibility, Coherence, Imageability, Sense of Order

Table 7. ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62.403	6	10.400	1271.125	.000 ^b
	Residual	1.604	196	.008		
	Total	64.006	202			

a. Dependent Variable: Visual_Quality

b. Predictors: (Constant), Naturalness, Disturbance, Visibility, Coherence, Imageability, Sense of Order

Table 8. Coefficients^a

Model		Unstandardized Coefficients		Beta	t	Sig.	Collinearity Statistics	
		B	Std. Error				Tolerance	VIF
1	(Constant)	.014	.040		.356	.723		
	Sense of Order	.139	.011	.188	12.464	.000	.563	1.775
	Coherence	.172	.009	.294	20.270	.000	.609	1.641
	Disturbance	.137	.008	.200	17.612	.000	.988	1.013
	Visibility	.163	.008	.272	20.096	.000	.699	1.431
	Imageability	.148	.008	.271	19.426	.000	.658	1.521
	Naturalness	.216	.009	.314	24.476	.000	.778	1.286

a. Dependent Variable: Visual_Quality

Table 9. Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions						
				(Constant)	Sense of Order	Coherence	Disturbance	Visibility	Imageability	Naturalness
1	1	6.688	1.000	.00	.00	.00	.00	.00	.00	.00
	2	.097	8.286	.02	.01	.20	.32	.02	.03	.00
	3	.074	9.523	.00	.03	.22	.01	.25	.29	.02
	4	.050	11.594	.00	.02	.18	.14	.27	.14	.36
	5	.043	12.425	.01	.02	.11	.14	.41	.54	.13
	6	.028	15.389	.02	.77	.27	.00	.02	.00	.37
	7	.019	18.555	.95	.15	.02	.39	.04	.01	.12

a. Dependent Variable: Visual_Quality

Discussion

The study investigates uncharted visual parameters of a landscape in a forest park in the suburbs of Qazvin, Iran. One innovation of this study consists of classifying the respondents into Experts and Non-experts. Another is that it takes concepts used by Tveit et al. (2006) and applies them to non-European landscapes, specifically forest park landscapes in the suburbs of Qazvin, Iran.

From the Beta Values, the variables Naturalness, Coherence, Visibility, and Imageability, respectively, 0.314, 0.294, 0.272, and 0.271, account the most for the dependent variable (visual quality). The inherent human need to have natural environments is found in the priority of naturalness being the best predictor (= 0.314). Within the setting of Barajin Park, this highlights the utmost significance of maintaining and developing its natural

features, which include native plants and water bodies and the topography, because the natural features are leading factors that contribute to aesthetic pleasure of the visitors. This observation is especially relevant considering the fact that the park is situated in the dry outskirts of Qazvin and it is a source of a green oasis. The fact that naturalness is highly valued implies that the ecological integrity must be sensitive to future developments so that it does not introduce artificial features that are likely to reduce the perceived authenticity of the natural environment.

The secondary role of the coherence ($= 0.294$) indicates that the visitors do not just want nature, but desire to experience the landscape, which is legible and structured. This sense of order is probably due to the park design, which incorporates specific routes, demarcated activity zones, and systematic groupings of natural and artificially made features. Such coherence can assist users in making the space mentally mapped, to lessen confusion and improve the total recreational experience. This implies that a totally in the wild or anarchy nature might not be as good as one which manifests a ratio of naturalness to the understandable and human-sized order.

The pronounced preference for 'naturalness' identified in this study stands in marked contrast to findings from research in dense urban parks or historic landscapes, where factors such as 'complexity' or 'historicity' typically emerge as more dominant. This clear divergence serves to underscore the profoundly context-dependent character of landscape preferences. Specifically within Barajin Park, its role as a 'green oasis' within an arid regional climate fundamentally shapes its perception as a vital natural refuge. This nuanced understanding—that a landscape's value is amplified by its juxtaposition with the surrounding environment—represents a significant and subtle contribution to the existing literature.

Moreover, the significant meanings of visibility ($= 0.272$) and imaginability ($= 0.271$) are interwoven and very much applicable in a forest recreational park. Visibility or the

feeling of openness and view will be essential in a park setting as it will provide the visitors with a sense of safety, mastery and pleasure in mountain panoramic scenes of the Alborz Mountains. Imagery is the process of developing impressive and unique scenes. Other features, including artificial lake, unique gazebos, and the difference between grass lawns and woodlands are bound to be highly visual anchors, which will provide unforgettable experiences that will distinguish the identity of this park in the minds of visitors. These factors turn the park into more than a green area, where people can come again and again, a place with its own personality, which promotes emotional bonds.

The T-Test comparisons of the two groups of Experts and Non-experts show that the difference in the opinions of these two groups is rather small and nearly the same (Table 4). That is an impressive result, the convergence of the expert and popular view. It questions the dualism occasionally invoked by the literature of landscape assessment and indicates that the visual ideas produced by Tveit *et al.* (2006) possess high, cross-cultural and interdisciplinary validity. Such a small variation indicates that landscape architects and planners in this profession are generally in harmony with the taste of the people. This congruence augers well with the participatory planning processes because it implies that more expert-led designs of the Barajin Park will be more congruent to the aesthetic demands of the audience and will result in a higher degree of ownership and gratification among the users of the park.

The VIF reported that in the range of 1 to 2, showing acceptance of the results, absent substantial multicollinearity between the variables.

These results are almost in line with Motaharirad, M., & Ansari, A. (2025) in evaluating the visual quality indicators. In that study, the Complexity, Coherence, and Disturbances indicators were somehow important concepts for evaluation, whereas in this study Naturalness, Coherence, Visibility, and Imageability indicators are more important for explaining the dependent

variable. Being a suburban forest park, its primary attraction is providing escape and immersion in a natural habitat and this could increase the value of naturalness. The topographic location that will probably provide views justifies the significance of viewability. Conversely, research devoted to dense urban parks can pay more attention to complexity (or diversity) as the visual stimulation in the more limited area is necessary.

Since several case studies were compared in that study and the correlation among variables was the criterion, it is different from the present study. The present study considered the explanation of visual quality of the forest park by Seven dependent variables. The reasons why Naturalness, Coherence, Visibility, and Imageability indicators are more explanatory of the visual quality of the park are probably due to the type of design in which mountains, vegetation, defined roads, defined areas for each use, and the available topography are particularly considered.

In addition to the statistical findings, this research has practical implications on management and development of Barajin Forest Park in the future. The powerful factor of naturalness means that a conservation-first strategy is required. The priorities of management strategies should be the health of native plant communities, preservation of the quality of the water in the lake and streams, and the minimization of habitat fragmentation. In order to be more coherent and more visually attractive, the wayfinding and signage may be introduced in a way that combines with the natural environment (e.g. made of natural materials), and creates major viewpoints and landmarks that take advantage of the views in the park. The fact that the disturbance was a strong negative predictor places a serious management issue to be minimized the effect of visitor induced disorder like littering, unauthorized fires and vandalism. It is important that the visual appearance that the visitors obviously appreciate is sustained by public awareness and a strong waste disposal infrastructure.

It is recommended that managers, planners, and landscape designers further accept the regular pattern of arrangement of natural and artificial factors like trees and vegetation in the park, furniture, and gazebos (for enhancing the Sense of order), and pay attention to some inappropriate human activities like lighting fires, producing waste, and inappropriate behavior (for the prevention of the sense of disturbance).

The limitation of this study is the focus on a specific forest park, which may not be generalizable to other spaces. Moreover, the data were limited to surveys, and qualitative expert opinions or interviews were not included. Although the photographs survey approach offers control and comparability of data, it is a simplified method of the multi-sense dynamic experience of being in a landscape. The vocal of birds and water, the sense of wind, and the sense of physical movement through the space is not evaluated. Moreover, time of day, seasonal changes, and weather conditions that the photographs were taken might affect ratings unintentionally and this aspect is out of research.

Future research may pursue qualitative paths, using visitor interviews or image analyses, toward an improved insight into the semantic dimensions of the visual quality of the forest park. Moreover, contrasting forest parks with urban parks might yield intriguing observations. In particular, one of the possible ways that future research might use includes conducting interviews on-site or using participatory mapping activities to reveal the emotional and symbolic sense that the visitors assign to certain sites in the Barajin Park. It would also be useful to conduct a longitudinal study involving the aesthetic perceptions all four seasons since the park is expected to have a changing nature. Lastly, using this same methodological approach in the dense urban park in Qazvin would enable one to directly compare results and to learn how landscape preferences vary across different green space typologies in the same cultural setting.

Conclusions

An important consideration in landscape policy-making, design, and management of forest parks bore on public opinion. The research clearly demonstrated that the key visual concepts introduced by Tveit et al. (2006) are key indicators for designers, researchers, and decision-makers to visually assess landscapes from rather diverse group perspectives.

This investigation showed that visual quality is largely attributed to indicators such as Sense of order, Coherence, Disturbance, Visibility, Imageability, Diversity, and Naturalness. From the regression model, it was found that these indicators could significantly enhance the visual experience of visitors.

One of the most vivid facts of this study is how the laypeople and experts judge. This agreement denies possible dichotomies of professional and popular taste and supports the broadening of the conceptual framework elaborated. Registering a pragmatic perspective, this convergence is highly convenient, i.e., design interventions applied by professionals who are knowledgeable about these principles will, undoubtedly, be more accommodating to the expectation of people and, hence, will leave users more satisfied and feel a sense of belonging to a community.

Moreover, absence of multicollinearity implies that these factors could be utilized independently and effectively in landscape design. This finding would help designers and planners to design green sites focusing on effective visual instruments and significantly ameliorate visitor experiences.

To align the management and design of Barajin Park with the key findings of this

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study, the following strategic actions are recommended:

Amplify Natural Character: The primary management focus should be to preserve and rehabilitate native plant communities and aquatic features. Interventions should be designed to minimize visual intrusion, notably by restricting the introduction of large-scale artificial structures that compromise the natural vista.

Foster Distinct Identity: To strengthen the park's memorability, we recommend the strategic development of unique and symbolic landmarks. The introduction of distinctive elements, such as signature water fountains or architecturally unique wooden pavilions, can serve as powerful visual anchors that enhance the park's overall imageability.

Mitigate Human Impact: Proactive measures should be implemented to preserve environmental quality. This includes establishing visitor education programs on environmental stewardship, coupled with ensuring a sufficient, strategically located supply of waste receptacles. These bins should be aesthetically designed to integrate seamlessly with the natural surroundings to effectively reduce littering and vandalism.

Overall, this study emphasizing the visual factors in landscape quality contributes a guideline for planning and designing green spaces and forest parks while paving the way for future qualitative research and comparative studies.

Conflict of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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