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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, was examined using an established conceptual framework comprising seven visual criteria: sense of order, coherence, disturbance, visibility, imageability, diversity, and naturalness. These criteria were assessed through an online survey employing photographic 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. The results highlighted 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 framework to a non-European context, 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 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—shaped by its structure, vegetation, and overall landscape character—plays a major role in its selection as a recreational destination. Landscape is widely regarded as a key element in defining environmental identity, vitality, and sustainability, as well as in facilitating meaningful interaction between the environment and its users (Golchin et al., 2013).

Moreover, understanding the recreational quality of green spaces, along with visitors' behaviors and preferences, is crucial for developing effective conservation strategies for forest parks (Chen & Qi, 2018). The visual elements of landscapes have been evaluated by several experts (Kaplan, Kaplan, & Brown, 1989; Lothian, 1999; Zube, Sell, & Taylor, 1982).

Assessment of landscape visual quality can be approached through two strategies: objective and subjective perception. The objective strategy relies on expert evaluation based on physical landscape parameters and a numerical scoring system. In contrast, the subjective approach centers on citizens' preferences and visual experiences, which are shaped by personal memories, associations, meanings, concerns, and individual perceptions of space (Lothian, 1999).

Among the various approaches to environmental quality assessment, the expert (professional) method and the consumer preference method are the most prominent and widely used (Zube, Sell, & Taylor, 1982; Daniel & Vining, 1983). In evaluative models, assessment incorporates visual, auditory, and emotional components, typically framed within categories of natural landscape beauty. When examining people's preferences, the principle that "beauty lies in the eye of the beholder" is critical, as evaluations are shaped by individuals' aesthetic sentiments and their perception of landscape features (Naroei & Yal, 2021). A substantial body of research has addressed 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 landscape assessment is a well-established field, most research has concentrated on pristine natural environments or densely vegetated urban parks, creating a notable gap in knowledge regarding the visual quality of suburban forest parks—particularly within the culturally and geographically distinct contexts of the Middle East. The present study addresses this oversight through a focused investigation of Barajin Park, a key suburban forest on the outskirts of Qazvin, Iran.

Material and methods

Pilot area

The capital of Qazvin Province, 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 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 photographs can serve as a valid proxy for visual assessments—supported by numerous studies on landscape visual quality—this study employed photographic tools to evaluate the forest park landscape (Daniel & Meitner, 2001; Law & Zube, 1983; Pérez, 2002; Rogge, Nevens, & Gulinck, 2007; Wherrett, 2000). The questionnaire included 12 images representing forest park landscapes (Figure 2), selected from 35 photographs taken by the author in 2025. Image selection was guided by on-site observations to ensure correspondence with actual conditions and the reality of the location, allowing only those photographs that adequately represented the indicators to be chosen. All final images were in color, taken at eye level, and captured from appropriate distances to effectively convey the intended subject matter.

Photo (1)

Photo (2)

Photo (3)

Photo (4)

Photo (5)

Photo (6)

Photo (7)

Photo (8)

Photo (9) Photo (10)

Photo (11) Photo (12)

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

Variables

Considerable research over the past few decades has addressed visual feature analysis for landscape assessment. In their literature review, Tveit et al. (2006) synthesized various aspects of landscape aesthetics, visual concepts, and preferences into rural categories, proposing a framework organized around nine basic visual concepts: Stewardship, Coherence, Disturbance, Historicity, Visual scale, Imageability, Complexity, Naturalness, and Ephemera.

To refine the measurement process and incorporate broader expert input, it was deemed justifiable to adopt synonyms for certain concepts and to omit some indicators. Stewardship, for instance, can be substituted with Sense of order, while Visual scale is equivalent to Visibility (Bell, 1999), and Complexity can be replaced by Diversity (Angileri & Toccolini, 1993).

In this study, visual quality serves as the dependent variable, with seven indicators—Sense of order, Coherence, Disturbance, Visibility, Imageability, Diversity, and Naturalness—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 Leve Expert	High school Diploma Undergraduate and graduate student Undergraduate and postgraduate student PhD student and PhD 72
Non-expert	131

Statistical methods

In all, there were seven indicators summed and modified for assessment of the visual quality of the landscape, from Tveit 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 are 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		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			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 coherence (β = 0.294) suggests that visitors seek not merely nature, but a landscape that is legible and structured. This sense of order likely stems from the park's design, which incorporates designated routes, demarcated activity zones, and systematic arrangements of both natural and built features. Such coherence enables users to mentally map the space, reducing confusion and enhancing the overall recreational experience. This implies that a completely wild or chaotic natural environment may be less appealing than one that balances naturalness with comprehensible, human-scale 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 divergence underscores the profoundly context-dependent nature of landscape preferences. Within Barajin Park specifically, its role as a "green oasis" in 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 contribution to the existing literature.

Moreover, the substantial weights of visibility (β = 0.272) and imageability (β = 0.271) are closely intertwined and highly relevant in a forest recreational park. Visibility—the sense of openness and expansive views—is essential in a park setting, providing visitors with feelings of safety, mastery, and pleasure, particularly through panoramic scenes of the Alborz Mountains. Imageability refers to the creation of distinctive and memorable scenes. Features such as the artificial lake, unique gazebos, and the contrast between grassy lawns and woodlands serve as strong visual anchors, fostering unforgettable experiences that distinguish the park's identity in visitors' minds. These elements elevate the park beyond a mere green space into a place with its own character, encouraging repeat visitation and promoting emotional attachment.

T-test comparisons between expert and non-expert groups revealed relatively small and nearly similar differences in opinions (Table 4). This convergence of professional and public perspectives is noteworthy, as it challenges the expert–lay dichotomy occasionally invoked in landscape assessment literature and suggests that the visual concepts proposed by Tveit et al. (2006) possess strong cross-cultural and interdisciplinary validity. The minimal variation indicates that landscape architects and planners are generally aligned with public aesthetic preferences. This congruence bodes well for participatory planning processes, implying that expert-led designs for Barajin Park are likely to resonate with user expectations, thereby fostering greater ownership and satisfaction among park visitors.

Variance inflation factor (VIF) values ranged from 1 to 2, indicating acceptable results with no substantial multicollinearity among the variables.

These findings are largely consistent with those of Motaharirad and Ansari (2025) in their evaluation of visual quality indicators. However, while their study identified Complexity, Coherence, and Disturbance as important concepts, the present study found Naturalness, Coherence, Visibility, and Imageability to be more significant in explaining the dependent variable. As a suburban forest park, Barajin Park's primary attraction lies in providing escape and immersion in a natural habitat, which elevates the value of naturalness. Its topographical setting, which affords expansive views, further justifies the prominence of visibility. In contrast, research on dense urban parks may assign greater importance to complexity (or diversity), as visual stimulation is more necessary within confined spatial contexts.

The present study differs from Motaharirad and Ansari (2025) in both approach and objective. While their work compared several

case studies based on correlations among variables, this study focused on explaining the visual quality of a single forest park using seven dependent variables. The finding that Naturalness, Coherence, Visibility, and Imageability are more explanatory of visual quality is likely attributable to the park's design features—including mountainous terrain, vegetation, defined road networks, designated use zones, and the available topography.

Beyond its statistical findings, this research carries practical implications for the future management and development of Barajin Forest Park. The strong influence of naturalness calls for a conservation-first strategy, with management priorities centered on maintaining the health of native plant communities, preserving water quality in the lake and streams, and minimizing habitat fragmentation. To enhance coherence and visual appeal, wayfinding and signage should be integrated harmoniously with the natural environment—using natural materials, for example—while major viewpoints and landmarks should be developed to capitalize on scenic vistas. The significant negative impact of disturbance presents a critical management challenge, requiring efforts to reduce visitor-induced disruptions such as littering, unauthorized fires, and vandalism. Sustaining the visual qualities that visitors clearly value will depend on public awareness campaigns and robust waste disposal infrastructure.

It is recommended that managers, planners, and landscape designers maintain regular patterns in the arrangement of both natural and artificial elements—such as trees, vegetation, furniture, and gazebos—to reinforce the sense of order. At the same time, attention should be given to curbing inappropriate human activities, including lighting fires, generating waste, and other disruptive behaviors, to prevent a sense of disturbance.

This study has several limitations. Its focus on a single forest park may limit the generalizability of findings to other settings. Additionally, the data were restricted to survey responses, without incorporating qualitative expert opinions or interviews. While the photographic survey approach offers control and comparability, it simplifies the multisensory, dynamic experience of being in a landscape—failing to capture sounds such as birdsong and water, the sensation of wind, or the physical experience of movement through space. Furthermore, the timing of photographs, seasonal variations, and weather conditions may have inadvertently influenced ratings, an aspect beyond the scope of this research.

Future research could pursue qualitative pathways, such as visitor interviews or image analysis, to gain deeper insight into the semantic dimensions of visual quality. Comparative studies between forest parks and urban parks may also yield valuable observations. In particular, on-site interviews or participatory mapping activities could reveal the emotional and symbolic meanings visitors attach to specific sites within Barajin Park. A longitudinal study examining aesthetic perceptions across all four seasons would also be useful, given the park's changing nature. Finally, applying the same methodological approach to a dense urban park in Qazvin would enable direct comparisons and shed light on how landscape preferences vary across different green space typologies within the same cultural context.

Conclusions

Public opinion represents a critical consideration in the policy-making, design, and management of forest parks. This study clearly demonstrates that the key visual concepts introduced by Tveit et al. (2006) serve as valuable indicators for designers, researchers, and decision-makers in assessing landscapes from diverse group perspectives.

The investigation revealed that visual quality is largely attributable to indicators such as Sense of order, Coherence, Disturbance, Visibility, Imageability, Diversity, and Naturalness. The regression model confirmed that these indicators significantly enhance visitors' visual experience.

A particularly noteworthy finding is the convergence between lay and expert judgments. This agreement challenges the

presumed dichotomy between professional and public aesthetic preferences and supports the broader applicability of the conceptual framework. From a pragmatic standpoint, this convergence is highly advantageous: design interventions implemented by professionals informed by these principles are likely to align more closely with public expectations, thereby fostering greater user satisfaction and a stronger sense of community belonging.

Furthermore, the absence of multicollinearity among the variables indicates that these factors can be utilized independently and effectively in landscape design. This finding enables designers and planners to develop green spaces with a focus on effective visual instruments, significantly enhancing visitor experiences.

To align the management and design of Barajin Park with the key findings of this study, the following strategic actions are recommended:

Amplify Natural Character: The primary management focus should be on preserving and rehabilitating native plant communities and aquatic features. Interventions should be designed to minimize visual intrusion, particularly by restricting large-scale artificial structures that could compromise natural vistas.

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, alongside ensuring a sufficient and strategically placed supply of waste receptacles. These bins should be aesthetically designed to integrate seamlessly with the natural surroundings, effectively reducing littering and vandalism.

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

Conflict of interest

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

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