LANDSCAPE EVALUATION AT PARQUE SÃO LOURENÇO REGARDING TOURISM AND RECREATIONAL PURPOSES

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ABSTRACT

This research examined the visual quality of landscape of Parque São Lourenço in Curitiba City, Paraná State, Brazil, through indirect and direct methods. In the indirect method, we used picture analyses and digital satellite image of the total park area for the classification of landscape elements. On the landscape map of class quality without the diversity factor, 52.1% of the grids were rated GOOD; 8.4% REGULAR and 4.2% as POOR. On the landscape map of class quality including the diversity factor, 8.4% of the grids were rated GOOD; 31% REGULAR and 25.2% POOR. In the direct method, we applied 84 questionnaires where respondents attributed value to the visual quality of pictures taken in the grids that represented the landscape map of class quality. The results including the diversity factor showed 11% for the grid classified as GOOD; 11.61% as AVERAGE and 8.26% as POOR. The results without considering the diversity factor showed 10.69% for the grid classified as GOOD; 6.21% as AVERAGE and 6.48% as POOR. The diversity factor in the indirect method overestimated values of some grids and diverged from values found in the direct method. These results may contribute to better planning of landscape for tourism and recreational activities. Keywords: Green areas; Tourism; Recreation; Landscape preference.

AValiação da Qualidade e Diversidade da Paisagem do Parque São Lourenço para Fins Recreativos e Turísticos

RESUMO

Esta pesquisa analisou a qualidade visual da paisagem no Parque São Lourenço – Curitiba – PR, por meio do método indireto e direto. No método indireto, foi utilizada uma imagem digital de satélite da área total do parque para a classificação dos elementos da paisagem e análise de fotografias. No mapa das classes de qualidade da paisagem sem o fator diversidade 52,1% das quadrículas receberam classificação boa; 8,4% média; e 4,2% ruim. No mapa das classes de qualidade da paisagem com o fator diversidade, 8,4% das quadrículas receberam classificação boa; 31% média; e 25,2% ruim. No método direto, foram aplicados 84 questionários, onde os entrevistados atribuíram valor a qualidade visual apresentada nas fotografias tiradas nas quadrículas representadas nos mapas de classe de qualidade da paisagem. Os resultados considerando o fator diversidade foram 11% para a quadrícula considerada BOA; 11,61% para a MÉDIA; e 8,26% para a RUIM. Sem considerar o fator diversidade 10,69% para a quadrícula considerada BOA; 6,21% para a MÉDIA; e 6,48% para a RUIM. O fator diversidade no método indireto super valorizou algumas quadrículas, não coincidindo com os valores encontrados no método direto. Estes resultados podem contribuir para o planejamento da paisagem e subsidiar planejamentos turísticos e recreativos. Palavras-chave: Áreas verdes; Turismo; Recreação; Preferência paisagística.

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INTRODUCTION

Parks, green areas for public use, are places created to provide several services, such as biodiversity conservation, leisure, recreation and even touristic activities.

The city of Curitiba, Paraná State, Brazil, is an example of a city that has great concern with the conservation of its green areas, be they parks, gardens, forests among other typologies, aggregating to them aesthetic and touristic values. The landscape in these spaces may be composed by natural, artificial and cultural elements (FORMAN and GODRON (1986) BOMBÍN (1987), BOLÓS (1992) and NUCCI (2007) and in this context, the man, besides an observer, is considered one of the elements that composes the landscape scenario (BIONDI, 1990; SHAMA, 1995).

The combination of natural, cultural and anthropic elements provides to the landscape greater attractiveness (BOLÓS, 1992) and it is used as an instrument to measure the capacity of use of a given area for leisure and tourism.

In this context, the visual quality of the landscape will depend on the quality of the elements that compose it, which will directly influence on the visual quality of the immediate surroundings and the scenic beauty of the site. In addition to the aesthetic factor, the visual quality of the landscape is highly subjective, once the visual quality is perceived and evaluated in many diverse ways according to the personal preference of an observer and emotional values (BOLÓS, 1992; CONESA, 1997).

Therefore, in establishing values that determine visual quality of a given landscape, it is necessary to use methodologies of landscape assessment, which may be direct, indirect or mixed, where values are established according to the preservation of the landscape components.

Pires (1993) used the indirect method to evaluate the visual quality of landscape and highlighted that this method allows to establish variables and criteria for the assessment of the landscape. The author also emphasized the need to know territorial characteristics, as well as the availability and quality of the data to be used in studies on landscapes.

Bastarz (2009) used the direct and indirect methods to evaluate the preference for landscape in the municipality of Morretes, Paraná State, Brazil, to provide support for the planning of local tourism. The author used the Q method to assess landscape values.

In a study case on landscape management and tourism development in the city of Curitiba, Paraná State, Brazil, Hardt and Hardt (2010) used the integration of the direct, indirect and mixed methods to assess the landscape and observed that in the surroundings of the tourist attractions, visual interferences caused by urban expansion tend to compromise landscape quality.

Because Parque São Lourenço is a green area that integrates tourist attractiveness with great recreational potential to the city of Curitiba, this study investigated the quality and diversity of landscape in this park to provide basis for the planning recreational and touristic elements.
MATERIALS AND METHODS

Characterization of the study area

The Parque São Lourenço is situated in the northern region of Curitiba City, Paraná State, Brazil, and covers an area of 203,918m² (20.4 ha) (Figure 1)

Data from IPPUC (2011) show that the Parque São Lourenço was created in 1972, after a huge flood in 1970 that burst the São Lourenço dam. A significant part of the area was covered with water from the Belém River as a way to control flooding. The field study showed that the lake is a great tourist attraction to the site.

The Parque São Lourenço was started in an area formerly used for a glue factory, whose chimney is easily visualized in the distance and its machinery was transformed into sculptures, which comprise the “Centro de Criatividade” (Creativity Center). Five buildings of the old factory were renovated and adapted to hold an art studio, an auditorium, a gallery and a library, which are spaces that support creativity (IPPUC, 2011).

Since June 1998, the house of the sculptor Erbo Stenzel has been opened as a cultural incentive after being reassembled and renovated. The place holds exhibits, collections and archives of this sculptor.
The equipment and services available to users of Parque São Lourenço comprise a playground, a skate rink, a running track, barbecues, a Creativity Center, a studio, an administration office, restrooms, soccer and volleyball courts, a bridge, a bicycle lane, a lake, a parking lot and a police station.

The natural elements of Parque São Lourenço are represented by the fauna comprised of cavies, wild rodents, opossums, bats, thrushes, herons, biguás (*Phalacrocorax brasilianus*), saracura (*Aramides saracura*), quero-quero (*Vanellus chilensis*), coleirinha (*Sporophila caerulescens*), pintassilgos (*Carduelis magellanicus*), tico-tico (*Zonotrichia capensis*), galinhas-d'angola (*Numida meleagris*), woodpeckers, owls and hawks. The flora comprises fragments of native forests and tree species such as mastic, guava, alfeneiro (*Ligustrum lucidum*), extremosa (*Lagerstroemia indica* L.), pinheiro-bravo (*Pinus pinaster*), cinnamon, pau-de-bugre (*Lithraea brasiliensis* March), pitangueira (*Eugenia uniflora* L.), among others (IPPUC, 2011).

The Parque São Lourenço is always open to the public and there is access to the park by the bus lines Abranches, Vila Suíça, Jardim Chaparral and Taboão-Água-Verde, Interbairros II (Terminal Cabral) and the tour line.

Despite the infrastructure for recreation and tourism and facility of access, the park is not ranked as the most visited in Curitiba City (IPPUC data) (Table 1).

**Table 1.** Ranking the most visited parks in 2007 in Curitiba City

<table>
<thead>
<tr>
<th>PARKS</th>
<th>CITATIONS</th>
<th>RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parque Barigui</td>
<td>9.23%</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
</tr>
<tr>
<td>Parque Tanguá</td>
<td>8.41%</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
</tr>
<tr>
<td>Parque Tingui</td>
<td>1.52%</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
</tr>
<tr>
<td>Parque São Lourenço</td>
<td>1.17%</td>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
<tr>
<td>Parque Passaúna</td>
<td>0.12%</td>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
<tr>
<td>Other parks</td>
<td>0.23%</td>
<td>6&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

The fieldwork showed that users of Parque São Lourenço are mostly local residents, not visitors. The activities mostly practiced in the park are jogging, walking and playground use, which are not usually performed by visitors, who usually use parks for landscape contemplation and drawing.

**Methods for landscape assessment**

The assessment of landscape quality and diversity of the Parque São Lourenço was carried out through indirect and direct methods.

**Indirect method**


Therefore, based on satellite digital imaging obtained from Google Earth® and georeferenced imaging from Superintendent of Water Resources Development and Environmental Sanitation (SUDERHSA, 2002), the total area of the park was divided based on the classification of landscape
elements as follows: grasslands, arboreal-shrubby vegetation, water, pavement, running track, leisure and built-in areas.

We attributed weights to these classes, according to the opinions discussed and agreed upon by respondents (Table 2).

Table 2. Classification of landscape elements in Parque São Lourenço

<table>
<thead>
<tr>
<th>Landscape elements</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built-in areas</td>
<td>1</td>
</tr>
<tr>
<td>Pavement</td>
<td>1</td>
</tr>
<tr>
<td>Leisure</td>
<td>3</td>
</tr>
<tr>
<td>Running track</td>
<td>3</td>
</tr>
<tr>
<td>Arboreal-shrubby vegetation</td>
<td>4</td>
</tr>
<tr>
<td>Water</td>
<td>5</td>
</tr>
<tr>
<td>Grassland</td>
<td>5</td>
</tr>
<tr>
<td>External area</td>
<td>0</td>
</tr>
</tbody>
</table>

We divided the park area into grids of 50x50m (2,500 m²) (Figure 2) and we calculated the relative area occupied by each landscape element. Based on these data, we attributed values to each grid, obtained by summing up the results of the multiplication of the weights of the elements by their respective occupation in percentage, as in the formula:

\[ \text{PQ} = \sum P \cdot O \]

where:

- \( P \) = weight of the grid
- \( P \) = landscape element weight
- \( O \) = relative occupation of the landscape element in the grid

To analyze the insertion of the characteristic “landscape diversity” into the assessment of each grid, we multiplied the weight of each grid (PQ) by the number of elements in the grid (1-8) as follows:

\[ \text{PQ}_d = \sum P \cdot O \cdot N \]

where:

- \( \text{PQ}_d \) = weight of the grid with diversity
- \( P \) = weight of the landscape element
- \( O \) = relative occupation of the landscape element in the grid
- \( N \) = number of elements in each grid

Based on values of the grid, we established three classes for quality and diversity of landscape elements: GOOD, REGULAR and POOR. These classes, of minimum amplitude, were established from the interval generated from the subtraction of grids of higher values by grids of lower values. For the grids located on the border of the park, we considered only those with at least 70% of its area occupied in the park area.

**Direct method**


From assessments using the indirect method described above, we selected grids that represented the classes GOOD, REGULAR and POOR, in both evaluations, for further analysis in the direct method.
For the direct assessment, we took four photographs using a digital camera (SONY Cybershot 7.1) from the center of each grid, following the direction north, east, south and west, using a compass (based on the magnetic north on June 9 and June 16, 2010). The photographs were displayed in sequence on a document (two photos per page) with the alternatives for assessment below each picture: “GOOD ( )”, “REGULAR ( )”, “POOR ( )”. These classes or categories referred to the intensity each photograph pleased the respondent. We established numeric values for each of these classes, 3, 2 and 1, respectively.

Each site surveyed received four evaluations, being one by photograph and each photograph received a value by each respondent. Therefore, for each respondent, the sites surveyed had a grade generated by the sum of the individual evaluation of each photograph (Table 3).
Table 3. Classification and class limits of grids selected for the method of direct evaluation in Parque São Lourenço using photographs.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Class limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POOR</td>
<td>4.00</td>
</tr>
<tr>
<td>REGULAR</td>
<td>6.67</td>
</tr>
<tr>
<td>GOOD</td>
<td>9.33</td>
</tr>
</tbody>
</table>

We observed the frequency of the classes evaluated by the respondents, obtaining the final classification of the grids for comparison with indirect assessment.

RESULTS AND DISCUSSION

**Indirect method**

The calculations for the selection of the grids allowed to elaborate two maps: one considering the diversity factor and another without considering diversity, both represented by colored grids (Figure 3).

Figure 3. Grids evaluated considering the diversity factor (map A) and without the diversity factor (map B). Red: Poor. Orange: Regular. Yellow: Good.

For the classification of the maps according to the classes of landscape quality with the diversity factor, we obtained the following results:
- 8.4% of the grids classified as GOOD;
- 31% of the grids classified as REGULAR;
- 25.2% of the grids classified as POOR.

Based on these results, we elaborated a graph with the frequency of the classes for the diversity factor (Figure 4).
For the map classification according to the classes of landscape quality without the diversity factor, we obtained the following results:
- 52.1% of the grids classified as GOOD;
- 8.4% of the grids classified as REGULAR;
- 4.2% of the grids classified as POOR.

Based on these results, we elaborated a graph of the frequency of the classes without considering the diversity factor (Figure 5).

Figure 5. Graph illustrating the results for grid without the diversity factor in three classes: POOR, REGULAR and GOOD.
**With the diversity factor**

By visiting the park in the selected grids, we observed that the results obtained do not represent the actual condition of the site. The site condition was overestimated, theoretically, by the diversity factor in the map. The site did not present significant visual quality, as an example, grid 7 (Figure 6).

Figure 6. Landscape analysis from grid 7 in Parque São Lourenço. North (A). East (B). South (C). West (D).

Grid 66 had the best average value. *In loco*, we can observe that its visual quality was better than grid 7, which was considered the best grid considering the diversity factor (Figure 7).

Grid 117 showed the lowest average with the diversity factor. Grid 117 does not have public use and therefore, does not interfere on the landscape quality for park goers (Figure 8).
Figure 7. Landscape analysis from grid 66 in Parque São Lourenço. North (A). East (B). South (C). West (D).

Figure 8. Landscape analysis from grid 117 in Parque São Lourenço. North (A). East (B). South (C). West (D).

We observed that most grids (n=37) received average classification, i.e., REGULAR, distributed all around the park. The grids classified as POOR were also well distributed, however, at a smaller number (n=30). The grids classified as GOOD were few (n=10), but with good distribution around the park.

We observed that the diversity factor had a significant influence on the result of the assessment; however, when we compare these results to those from the direct method, where the...
personal opinion is a relevant factor for the proposed objectives, there were some divergences in the grid classification.

**Without the diversity factor**

In this assessment method, we can observe certain coherence between the grids selected and the *in loco* analysis. Grid 64 had the best average (Figure 9).

Figure 9. Landscape analysis from grid 64 in Parque São Lourenço. North (A). East (B). South (C). The West (D).

Grid 107 showed the best average, and *in loco*, we observed that it did not have attributes to be visually attractive and to be chosen as the best average (Figure 10).

Grid 106 had the worst average. *In loco*, we actually observed that it had no visual attractiveness (Figure 11).
The best-classified landscapes are those more frequently visited by visitors. They also had better visual attractiveness, such as the running track, exercise equipment, the soccer court and the skate rink.

The playground (grids 107, 117 and 118), for example, is situated closer to built-in areas and farther from the lake, therefore, it had its visual quality compromised and the grids that contained...
the playground were classified as POOR or REGULAR in the two assessment methods. Once the purpose of this area is recreation, it may also be compromised for not offering visitors a pleasant visual environment.

Grid 7, at the extreme north of the park, was classified as GOOD in the indirect method with the diversity factor considered, because it had five of the seven elements considered for the composition of the diversity factor, in addition, these five factors had greater weight in the rank. In the direct method, this grid was also classified as GOOD.

Grid 66 was classified as REGULAR in the indirect method, however, in the direct method, respondents showed a unanimous opinion about its GOOD visual quality. Possibly the factor that contributed the most to this result was the centralized location of the grid, which covers almost all vision of the lake, bordered by grasslands with arboreal vegetation in the background. The composition of these elements had a very pleasant aspect to the public.

Grids 106 and 107 were classified as POOR and REGULAR in both methods, but these values were inversed in grid 107. This divergence may have been caused by the landscape in the surroundings of the grids, which sometimes contained built-in areas and pavements, and sometimes forests in the middle of the pavements and recreational areas.

Bobrowski et al. (2010) evaluated the visual quality of the Parque Tangá and observed that urban elements, such as built-in areas and architectonic buildings had a negative valuation, while natural elements, such as vegetation, water, topography and sky have a positive valuation.

The assessment GOOD attributed to grid 64 was consistent in both methods, due to its location, as it was the case of grid 66, and because the weight of the elements in grid 64.

This result demonstrates that the indirect method may be useful for certain purposes, but not for others, as in this case, where we intended to assess the visual quality of the park.

Direct method

For the direct method, we applied 84 questionnaires, 42 with the diversity factor considered and 42 without it, where the respondents had to analyze the visual quality in each photograph. The average values obtained for the grids selected by respondents are listed in Table 4.

Table 4. Average values for each grid

<table>
<thead>
<tr>
<th>Class</th>
<th>With diversity</th>
<th>Without diversity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>Regular</td>
</tr>
<tr>
<td>Grid</td>
<td>7</td>
<td>66</td>
</tr>
<tr>
<td>Average value</td>
<td>10.11</td>
<td>11.61</td>
</tr>
</tbody>
</table>

In the direct method, the result of grid classification was different from the result expected in the indirect method for some grids. When we considered the diversity factor, the indirect method overestimated the values of some grids and when it was excluded from the analysis, the grids classified as GOOD and POOR showed consistence, but the grid classified as REGULAR had its value altered. Differently for the results found by Bastarz (2009), where the diversity factor showed positive influence on landscape valuation in the town of Morretes, Paraná State, Brazil, in our study, there...
was negative influence on the landscape valuation considering the diversity factor. Gonzaga et al. (2004) used analysis of data collected in the field and through photographs for the landscape assessment for the Parque Municipal do Passaúna also observed variation in the results. However, the divergences identified may be attributed to “the smaller amount of information in the image, restricting the respondent from evaluating the landscape as a whole”.

The discrepancy of results found in both methods used in the current study corroborates Oliveira (2003) regarding insufficiency in an assessment based only on the indirect method to obtain an accurate vision of the object under evaluation, which required direct assessments in loco.

CONCLUSION

The results obtained in this study using the indirect method provided a more generalized vision of the entire area, without, however, demonstrating the situations that can be perceived by park goers. When we opt for the indirect assessment of the landscape, it is preferred to exclude the “diversity factor” when we use the method described in this study, because the “diversity factor” overestimated values of some grids, when compared to the direct and indirect method without the “diversity factor”. Regarding the specific landscape the Parque São Lourenço, it is recommended to recover areas with siltation and degraded vegetation in the northern region of the park, because they were some of the factors that most contributed to the lower valuation of this region, despite the landscape and touristic potential of the site, as observed in the indirect method.

Finally, in assessments of landscape quality, it is recommended to use more than one method, because they provide results that reflect the reality of the study site. Moreover, the results obtained in these methods constitute important tools for the touristic planning of a city by detecting potentialities and weakness of attractive elements.

REFERENCES


