Relation Between Urban Design and Citizens’ Perception. Case Study Biobio Riverside Park, Concepción, Chile

M Delpino-Chamy¹, L Navarrete²

¹Assistant professor. Faculty of Architecture, Urbanism and Geography. University of Concepcion.
²Graduate in Architecture. Faculty of Architecture, Urbanism and Geography. University of Concepcion.

E-mail: mdelpino@udec.cl, lauranavarrete@udec.cl

Abstract. This research analyses the impact of urban design on the vitality of public space. For the above, it explores the experience of inhabitants throughout indicators. This analysis allows us to identify relations between urban design and the perception of people inhabiting the place; identifying elements that favour or diminish the vitality of urban public spaces. As a case study, the Biobio Riverside Park, in Concepción, Chile, was selected. Based on its condition of being an attractive project, well located and designed; however, absent from activities and appropriation. The article researches bibliographically about some aspects of urban design, which modify the perception of inhabitants concerning the urban environment. Subsequently, several authors are analysed to identify the main urban design criteria considered for the development of an appropriate public space. With this background a methodological tool is constructed, to evaluate the perception of the inhabitants in relation to various urban design factors. Its application is done through surveys and planimetric analysis in the field. Finally, the survey and planimetry data were analysed simultaneously, in order to recognize the main elements of urban design, conditioning the vitality of the riverside park. Among the main results, security, accessibility, and diversity of activities emerge as the most influential urban design factors in the vitality of public space. Simultaneously, a clear difference between the participants’ perception is identified, depending on the proximity of their residence to the case study. This implies that both the sense of appropriation, as well as the sense of security and the attractiveness of the urban landscape, are determining aspects of perception, to promote the vitality of public space.

1. Introduction

Quality of life in a city is conditioned mainly by the quality of life of its public spaces (1). The uses and appropriations of these spaces by inhabitants, raise places of social gathering, strengthen local identities, build a sense of community (4) and enhance citizenship (2). Therefore, to support the formation of more cohesive communities in a sustainable urban model; it is necessary to focus attention on the study of public spaces (3).

The effectiveness and vitality of a public space depend on both, urban design qualities (1,3,5), as well as the dynamics and frequency of use of inhabitants on site (6,7,8). In consequence, the human body can be understood as a reference point to study comfort and well-being, associated with the permanence of people in a certain public space (9). Taking this approach into account, new indicators...
can be defined to measure the quality of urban spaces, based on people’s perceptions over a certain place.

Thus, this research hypothesis suggests that the assessment of public space requires a complementary analysis between design characteristics, and inhabitant’s perception, in order to identify factors conditioning the vitality of a particular place.

Therefore, the main objective is to analyze the relationship between urban design elements and the experience of inhabitants, apply to a specific public space: Biobio Riverside Park, in Concepción, Chile. This urban project has been selected as a case study, for being a significant space within the city’s landscape, concentrating high public investment and well design; however, showing signs of deterioration and abandonment.

To identify the reasons behind the deterioration of this project, the research is divided into 3 stages: First, a brief bibliographic review to analyze the relation between urban design factors, and their impact over the perception of inhabitants in the public space. Subsequently, different indicators to measure the vitality of urban public spaces considering inhabitant’s perception are reviewed, identifying factors of consensus among different authors. Finally, selected indicators are applied to the case study, analyzing the relationship between inhabitant’s perception and urban design criteria.

2. Urban design factors and their impact on the perception of the inhabitant
A critical element in terms of frequency of use in public space is urban design. Kevin Lynch defined it as “the art of creating possibilities for the use, management, and form of settlements or their significant parts” (11). From this approach, the design of a public space can both inhibit or promote the use and vitality of a place (10).

On a public space scale, the urban design addresses factors such as accessibility, security, comfort, diversity of uses and elements of identity. All qualities that configure and determine the attractiveness and vitality of a place.

From a methodological approach, other studies on spatial practices suggest observing people’s behavior in the public space, to establish a habitual pattern of dynamics, which indicates how vital a place is (7,8).

Complementarily, literature has identified aspects of the built environment that modify the way we feel in space (12). Among them, one of the most significant is related to the sense of security; being a key factor promoting or limiting the access of inhabitants to a certain place (10).

From this approach, urban design elements discouraging the permanence of people, and promoting feelings of insecurity among the inhabitants are the proximity to a high-speed road, the existence of dark corners or poor visibility, the presence of landfills, deteriorated areas, as well as the proliferation of mono-functional spaces (13). It follows that the vitality of a public space is directly associated with the attitude towards security (10).

Another area of complementary perception has to do with the attractiveness of the landscape, associated with the diversity of uses and the comfort of the public space.

Among its conditioning factors from urban design are: the presence of various activities and uses, elements of protection against climatic conditions, quality and well-distributed furniture, urban landmarks, proximity to natural elements and presence of symbolic elements (3,6,14,15).

Therefore, in order to promote the vitality of public space, it is pertinent to consider areas of perception associated with the sense of security and the attractiveness of the urban landscape, identifying their respective criteria and indicators concerning urban design. From this methodological approach, it will be possible to evaluate the quality of the public space, relating its design to the perception of the inhabitant.

3. Strategies to measure the quality of urban design from the experience of the inhabitant
Theories reviewing criteria to examine the quality of public spaces are varied. Some examples can be found in the works of Carlos Verdaguer (2005), Nagore Urrutia (2014), Enrique Mínguez Arquitectos (2009), Project for Public Spaces (2000) or the already traditional methodologies developed by Jan
Gehl during the last decades (1989, 2006, 2013). These works; with more coincidences than contradictions; invite to undertake a detailed review to identify those design criteria that can be identified from the expert's eyes and those that can be perceived and assessed directly by the inhabitants of the urban space.

It is important to differentiate those studies focused on examining the quality of public spaces, from those centered on reviewing the distribution of social equipment and infrastructure within the city, like the IDB's Emerging and Sustainable Cities program (2014), or the methodology proposed by Rueda (2012) through the Urban Ecology Agency of Barcelona (AEU BCN).

These studies; although of high significance; are focused on analyzing the sustainability of the urban system as a whole, rather than on the particularities of the human scale, and the relationship of the body with the public space.

Therefore, in order to establish a relationship between urban design and the perception of inhabitants; this research has identified the work of three authors who put their stamp on the link between space and the experience of living.

The first one is the study on the "Assessment of the conditions that make public space habitable in Colombia", by Páramo and Burdano (16). This work provides a table of questions that allow researchers to evaluate the quality of public space throughout interviews. Although the analysis is very comprehensive and directed towards the inhabitant, it is not hierarchical; lacking criteria to group the results and relate them to urban design dimensions.

The second investigation is a survey developed by the Project for Public Spaces (PPS) initiative. This work is designed to evaluate public spaces based on the perception of the inhabitant. The questions proposed by the tool are answered directly by the people present in the place and pose dimensions of analysis associated with Access and links, Image and comfort, Uses and activities and Sociability (7).

Finally, a third bibliographic reference is found in the text “Urban Design” by Raúl Meda. This work presents different elements for the evaluation of urban space, based on five design dimensions proposed by Kevin Lynch (1985): Vitality, Sense, Adaptation, Access, and Control (11).

3.1. Evaluation tool.

To develop an evaluation tool for the case study; criteria regarding the perception of space and urban design have been related, based on the three previously mentioned works. From this analysis, coincidences of approaches have been identified and organized hierarchically based on dimensions, factors, and indicators.

In general terms, it is observed that the predominant dimensions proposed by the authors focus on: Access and Connectivity, Security and Comfort, Activities and Uses, Image and Identity. In this regard, the methodological tool addresses a first dimension corresponding to Access and Connectivity, considering factors such as universal accessibility and connection with the surrounding urban tissue. The second dimension of Safety and Comfort explores factors related to safety, urban furniture, and pollution. The third dimension, related to Activities and Uses, addresses the factors of the diversity of uses, activities for different groups, activation at different times and group formation. Finally, the fourth dimension on Image and Identity deals with the factors of identity and landscape.

For each of the four dimensions and factors mentioned above, indicators have been defined. Some of them to be collected throughout a planimetric analysis and others based on a survey applied to inhabitants on the field (see Table 1).

Five field trips to Biobio Costanera Park were conducted to develop planimetric analysis and collect surveys (see Figures 1 and 2). On planimetry, traceability plans, travel routes and agglomeration-dispersion patterns map were developed.

The survey was applied based on an appreciation scale: yes, medium, no. Complementarily some open questions were incorporated. It was conducted on Thursday, Friday and Saturday, between 2:00 p.m. and 5:00 p.m., during the winter season; managing to collect 17 surveys, of which 11 were made to men and 6 to women. In all cases, the informed consent of the participants was provided.
Figure 1. Biobio Riverside Park Planimetric.  

Figure 2. Biobio Riverside Park Image.

Table 1. Tool for the evaluation of urban design criteria in relation with inhabitant’s perception.  

Source: Designed by authors.

| 1. UNIVERSAL ACCESSIBILITY | S | P | UNIVERSAL ACCESSIBILITY |
|-----------------------------|---|---|--------------------------|
| A.1.1 Equity of access for the different population groups. | x | A.1.1 Can people with different abilities access and participate in all activities? |
| 2. TRAFFIC | x | x | A.2.1 Is it easy to access the place? |
| A.2.1 Ability to be traveled (to reach it, to cross it, to move within it). | x | x | A.2.2 Can people use different means of transportation to get to the place? |
| A.2.2 The accessibility to public spaces from different means of transport. | x | x | A.2.2 Can people use different means of transportation to get to the place? |

| 1 SAFETY | SAFETY |
|-----------------------------|---------|
| B.1.1 Safe space. | x | x | B.1.1 Is it perceived as a safe place? |
| B.1.2 Presence of homeless people and drug addicts in the streets. | x* | B.1.2.1 Are there elements that make you feel insecure? Which ones? |
| B.1.2.1 Are there elements that make you feel insecure? Which ones? | x* | B.1.2.2 Where do you feel most insecure? |
| B1.3 Good night lighting. | x* | B.1.3 Is the night lighting of good quality? |

| 2. WEATHER | WEATHER |
|-----------------------------|---------|
| B.2.1 Sun / shadow. | x | x | B.2.1 Are the seats conveniently located? Are they in the shade? |
| B.2.2 Roofed areas. | x | x | B.2.2 Are there spaces to protect from sun and rain? |

| 3 POLLUTION. | POLLUTION |
|-----------------------------|-----------|
| B.3.1 Clean space. | x | B.3.1 Is the place clean? |
| B.3.2 Air pollution. | x* | B.3.2 Is the public space free of bad odors? |
| 3.3 Noise pollution | x | B.3.3 Does car noise affect your stay in public space? |
### 1. DIFFERENT USES.

| S | P | DIFFERENT USES. |
|---|---|-----------------|
| C. 1.1 Activities (opportunity to develop multiple activities). | X | X | C.1.1.1 Are there activity options to do? |
|  | X | X | C.1.1.2 Are there places to sit? |

### 2. DIFFERENT ACTIVITY GROUPS.

| C. 2.1 Mixed age (for all, children, youth, adults, seniors). | X | Is there a mixture of ages and ethnic groups that generally reflect the community? |

### 3. DIFFERENT SCHEDULES.

| C. 3.1 Usage Frequency. | X | C.3.1.1 At what time of the year do you like to visit this place? (autumn/winter - spring/summer). |
|  | X | C.3.1.2 How often do you visit this place? (weekly - monthly - exceptionally). |
|  | X | C.3.1.3 What day do you prefer to frequent the place? (week - weekend). |
|  | X | C.3.1.4 At what time do you usually go to the place? (morning, evening, night). |

### 4. AFFILIATION TO GROUPS.

| C.4.1 The opportunity to enter into social contact with other people. | X | X | C.4.1.1 Are people in groups? |
|  | X | C.4.1.2 Is it a place you would choose to get together with your friends? |

### 1. IDENTITY

| D.1.1 Identity elements (that a public place may be distinguished from another). | X | X | D.1.1 Are there elements that give identity to the place? |
| D.1.2 Cultural elements. | x | D.1.2 Are there cultural elements in the park? (sculptures, monuments, artwork) |
| D.1.3 Green areas. | X | X | D.1.3 Are there enough green areas within the park? |
| D.1.4 The presence of natural elements (plants, trees, fauna). | X | X | D.1.4 Are there enough trees? |

### 2. ENVIRONMENTAL IMAGE.

| D.2.1 Milestones. | X | X | D.2.1 Are there elements that you consider as a reference point in the place? |
| D.2.2 Tours. | X | X | D.2.2.1 What route do you usually do? |
|  | X | X | D.2.2.2 Are there different routes to walk in the place? |
| D.2.3 Borders. | X | X | D.2.3 What elements do you consider to be a limit within the public space? |
| D.2.4 Views. | X | D.2.4 Do you think there are attractive views in the place? |

Where S: Survey; and P: Planimetric.

X*: data not included in figures 3, 5, 7, 9

### 4. Discussion of results

From the applied surveys, it was possible to identify two types of inhabitants who frequented the Biobío Costanera Park: the inhabitants neighboring the sector (from now on, the residents) and the inhabitants coming from other neighborhoods of the commune or the region (from now, the visitors). The analysis of the results is based on these two types of users. Complementarily, desegregated data on gender and age have been incorporated, to assess specific factors, when necessary.
4.1. Dimension A - Access and Connectivity.
Regarding universal accessibility, there is consensus among residents, visitors, and planimetric analysis: the project does not facilitate access and habitability by people with reduced mobility (see Figure 3, factor A.1.1).

Conversely, accessibility and connectivity factors show significant discrepancies between residents and visitors (see Figure 3, factors A.2.1 and A.2.2). While 100% of the residents of the sector consider that access to the place is easy, 80% of visitors consider accessibility and connectivity to be bad. The planimetric study and urban design analysis explain the difference in perceptions, by identifying a footbridge that connects directly with the low-income housing complex, where residents live (see Figure 4).

**Figure 3.** Perception of the inhabitants regarding the Access and Connectivity of the Biobío Riverside Park Urban Project.
Source: Compiled by authors

![Access and Connectivity](image1)

Where A.1.1: Universal Mobility; A.2.1: Good accessibility; A.2.2: Good connectivity (different means of transport). Blue: yes; Orange: medium; Gray: no.

**Figure 4.** Planimetric Analysis Accessibility A.2.1 - Biobío Costanera Park Urban Project.
Source: Compiled by authors

![Planimetric Analysis](image2)

4.2. Dimension B - Security and Comfort.
71% of the residents of the sector declare perceiving the park as a safe place, versus 60% of the visitors who declare otherwise. While residents say they know each other; visitors identify the park as a place known for its danger (see Figure 5, factor B.1.1).

In addition, respondents were asked to identify those places where they felt most insecure; recognizing sites such as the proximity to Llacolen Bridge, the space between the multipurpose court, open space without protection towards Promenade Highway (Av. Costanera), as well as east and west entrances to the park. Therefore, it is evident that the scale of the metropolitan infrastructure
associated with the Llacolen Bridge and the Promenade Highway, contrasts with the human scale of the Biobio Riverside Park, generating critical transition areas between scales, not properly resolved by urban design strategies. Also, under the bridge, there is a small squatter settlement where people are usually observed using drugs. This point coincides with the east entrance to the park and is one of the elements causing the greatest insecurity.

Other differences are observed in relation to urban furniture. While 57% of residents believe that seats are sufficient, 50% of visitors identify their absence and poor location (see Figure 5, factor B.2.1). The planimetric analysis identifies that the seats are distributed only on the edge facing the river, and in the central area of the project, observing lacks in its location supporting areas of activities such as multi-court or children's play area.

The cleaning factor also showed no convergence of perceptions. While 71% of residents consider it a clean place, 70% of visitors consider the public space dirty and maintenance-free (see Figure 5, factor B.3.1).

Coincidences were observed only regarding the absence of spaces to protect against rain (see Figure 5, factor B.2.2), and the fact that car noise does not significantly impact on site (see Figure 5, factor B.3.3).

**Figure 5.** Perception of the inhabitants regarding the Safety and Comfort of the Biobio Riverside Park Urban Project. Source: Compiled by authors

![Security and Comfort](image1)

Where B.1.1: Security; B.2.1: Quantity of Seats; B.2.2: Furniture location; B.2.3: Roofed Areas; B.3.1: Cleaning (Maintenance of public space); B.3.3: Acoustic pollution. Blue: yes; Orange: medium; Gray: no.

**Figure 6.** Planimetric Analysis. Seats Location B.2.1- Biobio Riverside Park Urban Project. Source: Compiled by authors

![Planimetric Analysis](image2)
4.3. Dimension C - Activities and Uses
Regarding the evaluation of activities and uses, the difference between residents and visitors remains. Although among residents, there are almost equitable responses regarding the diversity of activities to do (43%), recognizing better appreciation between men, and the worst perception between women. Visitors at 80% estimate that there is a lack of alternatives (see Figure 7, factor C.1.1). The field study allowed to identify a small number of programs associated with the park: multipurpose court (promoting mainly men-centered activities), playgrounds, skating rink, bike path, and pedestrian walkway. There is an absence of shops and basic supplies stores.

In factor C.3, related to the frequency of visits, differences between residents and visitors are also identified. The former declares frequenting the project weekly, while visitors do it exceptionally. This data is consistent with the answers regarding factor C.4.1.2, against which 71% of residents would select the place to join their friends, while 60% of visitors would not.

Figure 7. Perception of the inhabitants regarding the Activities and uses of the Biobío Costanera Park Urban Project. Source: Compiled by authors

Where C.1.1.1: Diversity of activities; C.2.1: Mixture of ages (for everyone); C.3. Frequency of uses; C.4.1.1 People in Group and C.4.1.2: Meeting place with friends. Blue: yes; Orange: medium; Gray: no.

Figure 8. Planimetric Analysis Diversity of Activities C.1.1 - Biobío Costanera Park Urban Project. Source: Compiled by authors

4.4. Dimension D - Image and Identity
Convergence between residents and visitors, regarding the existence of elements that give identity to the park and the sufficiency of green areas, are observed (see Figure 9, factor D.1.1). Appreciations are also shared regarding the lack of diversity of routes (see Figure 9, factor D.2.2) and the absence of attractive views that accompany the landscape (see Figure 9, factor D.2.3). In this regard, the planimetric study coincides in recognizing the existence of a single edge route, where views towards the environment are blocked, although the park is located on the edge of the Biobio River, the widest in the country.
Discrepancies are identified regarding the sufficiency of trees and the existence of reference points within the project. While 86% of residents are satisfied with the trees available on site, 70% of visitors consider them insufficient (see Figure 9, factor D.1.3). This coincides with the analysis in the field, where a lack of arborization associated with the permanence zones was identified.

**Figure 9.** Perception of the inhabitants regarding the Image and identity of the Biobío Riverside Park Urban Project. Source: Compiled by authors

Where D.1.1 Identity elements (that a public place may be distinguished from another); D.1.3 Green areas; D.1.4 Presence of natural elements (plants, trees, fauna); D.2.1 Milestones; D.2.2 Tours; D.2.3 Borders; D.2.4 Views.

**Figure 10.** Planimetric Analysis Diversity of Routes D.2.2 - Biobío Riverside Park Urban Project. Source: Compiled by authors

Finally, regarding the results obtained, it is possible to identify which urban design elements are impacting the perception of inhabitants; therefore, limiting the vitality of Biobio Riverside Park, in Concepción, Chile. Among the most significant ones are:

- Deficiency in Accessibility and Connectivity of the project with the surrounding urban tissue. The park is concealed by the bridge and highway, favouring only the access of neighbouring residents in the immediate low-income vicinity, through the existing footbridge.
- Occupation of irregular lands associated with squatter settlement under the Llacolen Bridge, and presence of drug use in the main access to the project, discourage the arrival of visitors
- A small number of activities and basic supply stores. Urban furniture separated from existing activities and lacks elements to protect against wind and rain.
- Lack of diversity of routes and wasted views towards Biobío River, as an opportunity to strengthen the attractiveness and identity of the public space.
5. Conclusions
The study of bibliographic references has allowed us to identify the sense of security [10,13] and the attractiveness of the urban landscape [3,6,14,15], as determining areas of perception to promote the vitality of public space.

However, by linking the study of urban design elements with the analysis of inhabitants’ perception [8,9]; this research has identified the sense of appropriation as another important dimension, determining the dynamism of an urban project.

In the case of the Biobío Costanera Park, it is observed that both; the proximity to the urban project, as well as the access and connectivity infrastructure; favor the sense of appropriation by the residents in the vicinity of the Park. This access condition is one of the main urban design elements explaining the disparity of perceptions between residents, and those inhabitants from other neighborhoods of the urban conglomorate.

The main factors where disparities between visitors and residents were identified are accessibility, security, cleanliness, diversity of activities, frequency of visiting, amount of arborization and recognition of reference points. However, in every case, the planimetric analysis tends to support the visitors’ perspective. This observation could open reflection regarding two complementary hypotheses to be explored in future research:

- The sense of attachment increases the satisfaction of inhabitants regarding urban design elements, been more tolerant of poor design.
- Residents from a low-income sociodemographic group, manifest higher levels of satisfaction in relation to basic urban design elements.

In the case studies, the disparities of accessibility, difficult the possibility of appropriation of the project from inhabitant coming from other neighborhoods, impacting on their sense of security, reducing the vitality of the project, and missing the possibility of promoting social cohesion between inhabitants of different socioeconomically neighborhoods.

As long as the urban design elements that generate these disparities (such as poor access, illegal settlements, and scarcity of amenities) does not improve, the project will continue contributing to generate segregation between residents and visitors, missing the opportunity to be recognized as an iconic public space for the city, associated with its mighty river and the sights and activities that it offers.

It is also noticed a difference in perception between residents’ men and women, regarding the diversity of activities. Where men manifest satisfied, women not. This observation opens reflection regarding man-centered designs and activities in public spaces. No other significant differences between men and women were identified.

Finally, it is observed that the proposed measurement tool has proved to be successful in identifying the different perceptions between inhabitants, and therefore able to recognize the gaps in urban design that are promoting the deterioration of the significant coastal park analysed.

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