

**Designing sustainable cities through participatory design;  
an inclusive interdisciplinary methodology**

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**Abstract**

Aiming to create sustainable and inclusive cities that bridge the gap between polarized economic classes, urbanists and city planners in Mexico have started to encourage the participatory design process. This article explores the participatory design as an asset to strengthen community bonds and create awareness regarding the social and sustainable development of the city.

A case study was conducted in Querétaro, Mexico in *Los Alcanfores* Park. An interdisciplinary methodology was designed to integrate the community in the diagnosis, strategies, and the park's project. Data was analyzed through content and statistical analysis in order to validate and generate reliable results.

Results suggest that the participatory design process gradually engages the community. It has a snowball effect; participants attract and invite other members. Results indicate that the gradual involvement, allows participants to create a solid and informed opinion, focusing on collective needs rather than individual preferences. Therefore, the participatory design is considered to be a reliable and inclusive process to create awareness and aid opinion forming; leading to a focused and responsible design of the city.

## **Introduction**

Mexico is known for its richness in natural resources, for its landscapes, for its culture and traditions, its heritage, and people's warmth. The weather and natural diversity –from the dessert in northern Sonora through out the tropical rainforest in Chiapas – show the infinite possibilities and scenarios with which Mexicans live and interact. In terms of cultural values, habitants in Mexico are very proud of their history, costumes and traditions, of their music, art, dances, and economic activities. People have had the capacity and vision to preserve ancient rituals, to cohabitate with its landscape, and to inherit values throughout history (Delgado, 1993).

However, the rapid growth of cities and the postmodern culture, are beginning to threaten the preservation and conservation of natural, social, and cultural resources (Abonce, 2006). Today, urban planners, and government agencies are concerned about the future of mid size cities in Mexico. Mid size cities have a population growth rate of 2.5% to 5.3% each year (INEGI, 2011). In addition, following the urban growth model of the United States, cities are duplicating their size in a matter of years. This kind of configuration privileges the car, the industry, it increases social segregation, promotes economic disparity, destroys the natural ecosystems that once coexisted, and fragments the urban tissue (Jacobs, 1961). Today, it is imperative to create awareness among citizens, and start promoting healthy sustainable cities that will encourage the preservation of Mexico's social, natural, and cultural resources.

### ***Placemaking as a participatory process***

Participatory design can improve social fabric by reducing segregation and fulfilling the needs of a wide variety of habitants (Schneekloth, 1995). Today, placemaking gives the community the opportunity to be part of the creative process. The persistent actions and collaboration process empowers communities while making them aware of their needs and most importantly, of the collective needs (Silberberg, 2013). The main objective of placemaking is to return public spaces to people. It has appeared as an alternative to cure the disruption between the city and people, mainly due to the highly privileged automobile systems built in every sprawled city.

Mexico is a country of social disparity, where a small elite commonly makes decisions. Using the participatory design process to plan excluded communities, will allow people to get involved in projects that bring together local acquaintance and the experts' knowledge. Throughout its different stages, people acquire new information and become involved in an interesting and enjoyable process. Mexico lacks a structure in terms of political policy that connects community with stakeholders and government agencies. Implementing placemaking as a participatory process could bring closer the community and help people understand the collective needs in order to create places, and furthermore a city, that will be inherited into the next generations (Silberberg, 2013). According to David Harvey, the right to the city is the opportunity of enjoying its infrastructure and promoting equity; but most important it is the opportunity to change ourselves by changing the city (Harvey, 2008).

The proposed methodology brings together the principles of green areas design in urban regions and social participation with the aim of creating a guideline for future interventions.

## **Methodology**

*Description of the site.* In order to conduct the methodology a case study was developed in the city of Queretaro. This mid size city is located 200km north from Mexico City, characterized by its semiarid climate, colonial heritage and monuments, and it is the second upcoming economy in the country. Querétaro has 1 million habitants and a growth rate of 2.8% each year. It is considered to be one of the most sprawled cities in Mexico; each year it increases its size by 12.5% fostering urban and social segregation. In addition, according to recent studies that show the amount of green space in the city, (Meléndez, 2006) Querétaro has 2.81 square meters of green areas per habitant. According to SEDESOL<sup>1</sup> each city should have at least 6 square meters per habitant (SEDESOL, 2001). The WHO asks for 9 square meters per habitant (DAES, 1992). Therefore, Queretaro is an interesting case study to implement the designed methodology.

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<sup>1</sup> SEDESOL is the governmental institution in Mexico in charge of protecting and developing the social agenda guaranteeing the Access to infrastructure, education, and resources in general to each and every inhabitant of the country.

Furthermore, in order to limit the scale of the application, an urban park was selected as the focal point to start the case study and apply the methodology. Park “Los Alcanfores” was chosen due to its location, history, and mixed-use neighborhood.

*Research Design.* This research proposes a mixed methodology that captures quantitative and qualitative data through sequential transformative design and a concurrent nested design model. A theoretic perspective guides the study, however, fieldwork and the participatory process (throughout their different stages), capture a specific reality and therefore a unique approach towards the intervention of this specific park. The methodology was divided into six stages<sup>2</sup>.

1. Urban and social studies. The park and immediate context are analyzed. The analysis includes a historic review and its urban development. Data was collected through maps, diagrams, sketches, and small texts. The analysis included demographic and urban aspects such as gender, predominant age groups in the area, infrastructure and equipment, green spaces, historic landmarks, connectivity, housing typology, and transportation.
2. Ethnographic observation. Participatory observation allows the researcher to understand the relations among users of the park, the immediate context, and the built environment. An observation calendar was generated in order to cover several intervals and moments during the week. An observation guide was designed combining Nadia Monnet’s ethnographic observation guideline and the Kevin Lynch’s principles of *The Image of the City*. Data was collected through diagrams and narrative texts followed by content analysis.
3. Behavioral maps. The main objective of this tool is to gather quantitative data regarding the patterns of usage in the park: number of visitors that attend, age group, intervals, the time they spent in it, the area they frequent, and the developed activity. Information was gathered through previously designed maps following a determined calendar in order to cover all the detected intervals. Data was captured and analyzed with excel and SPSS program.
4. Questionnaires. Previously designed questionnaires included fill in the blank answers, multiple choice, open-ended questions, and a Likert reactive. They were applied

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<sup>2</sup> Students from Instituto Tecnológico y de Estudios Superiores de Monterrey were part of the analysis team. They conducted urban and ethnographic studies, behavioral maps, questionnaires, and a design workshop.

to informant actors with the aim of understanding how people arrive to the park, the transport they use, how long it takes them to arrive, what they considered appropriate and inappropriate aspects, their perception on natural resources and infrastructure, and finally the improvements that can be undertaken in order to preserve the Los Alcanfores.

5. Perceptual maps. In this method 56 distinctive elements, that represent positive and negative aspects of the park, were selected so participants could classify them according to what they consider a sustainable and appropriate park. Q-sort mapping was applied to 40 different visitors with the aim of capturing the collective perception. The Gaussian distribution probability theory was used to find the mean and random variables. Furthermore, a cluster analysis was conducted to understand the patterns and categories in which future interventions could be guided.

6. Design Workshop. A total of 40 participants assisted to the session, from which 18 were children between 4 and 13 years old. The adults performed three previously designed activities: a) good, bad, and opportunity areas in the park, b) activities and use patterns, and c) park preservation and sustainability. Activities included a couple of minutes to explain preliminary results and provide information regarding sustainable cities in order to guide the process. Children were asked to draw "My ideal park". This process provided qualitative and quantitative data that was analyzed along with preliminary results.

## **Results**

The results suggest an inherited social segregation dating from the beginning of the XX century (Somohano & Gutierrez, 2011). The growth of the city, along with the fact that the neighborhood is surrounded by industry, segregates a low-income sector from the equipment and infrastructure in the rest of the city. Nevertheless, the site has experienced several transformations; it was once an agriculture land, in the mid 30s became a eucalyptus forest, and finally a consolidated urban neighborhood by the late 60s. The area was known for its religious devotion for almost 40 years, holy ceremonies were common until - according to older residents - new habitants arrived to live in the area. Architecture landscape studies show a lack of wildlife, and endemic vegetation has been substituted in 70% of the region. Eucalyptuses were part of the character of the

place; due to a plague they were cut down. Today, a deep sense of nostalgia is experienced by visitors that remember the park as a forest like landscape where you could go to rest from the arid sun.

Los Alcanfores is composed by two sections; divided by the rail tracks. A fence that determines one main access in each section encloses the park's perimeter. Due to its elongated morphology the end parts of each section are rarely visited and lack maintenance. Its legibility is characterized by the constant appearance of paths and borders, rather than enclosing space they divide the green areas. Possible landmarks are suggested all along the north section; however, the only visited ones remain in the area of Cri-Cri sculptures<sup>3</sup>. The most important nodes were located in the main entrance of each park. Playgrounds and picnic areas were also recognized as important gathering points. Furthermore, the most important congregating spaces were green areas that bring together multiple activities or attractions for different ages.

Social patterns vary throughout the week. From Monday to Friday young mothers with babies or toddlers visit the park during the morning, the southern section is characterized by the elders' visits. During noon, teenagers from nearby high schools attend for a couple of minutes. During the afternoon family visits and sports activities for young people prevail. The weekends are characterized by family visits and teenagers that like practicing martial arts, parkour, and BMX<sup>4</sup>. Results show that 65% of the visits are during the weekend. Females use more the southern section (playing games prevail), and males congregate in the northern section (exercise prevails). Most of the visits are carried on by groups (90%); individual visits are rare and represent 10% of the total occupation. Results show that 45% of the visits last more than 30 minutes; some people stayed for more than 2 hours. Due to the cultural values and traditions, visits to the park become occasions to be spent with friends and family for long periods of time. The park becomes a destination.

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<sup>3</sup> The Mexican composer and performer Alfonso Gabilondo Soler, was the author of children's songs. He created the songs under the name "Cri-Cri: el grillito cantor" which became popular among children in 1984. Los Alcanfores created a section that honored the composer creating 7 human size sculptures representing the characters and stories of these songs.

<sup>4</sup> In the last couple of years martial arts and extreme sports have become popular among young people in Mexico.

Children from 4 to 12 years old represent the 25% of occupation of the park, teenagers 17% and young adults 15%. The most common activities inside the park are walking, sitting and relaxing, playing games, exercising, and riding a bicycle. Therefore, green areas and pathways are the most occupied spaces (30% and 28% respectively). Most people that attend Los Alcanfores are occasional visitors. People from 35 to 44 years old are more likely to become common users; they assist with their families. In terms of transportation, 45% visitors arrive by car, 22% arrives in bus, 25% walking, and only 7% arrive in bicycle. It is important to mention that half of the visitors have to travel more than 15 minutes to get to the park. Furthermore, results show that 50% of the participants travel from 6 to 10 km when they go to Los Alcanfores. Only 10% lives in a radius of 1km - according to urban studies is the ideal distance to attend walking.

The perceptual maps show that the most appropriate perceived aspects in the park were exercising, family areas, and nature. The most inappropriate aspects were the fact that there are no stores around, the Cri-Cri sculptures, and rusted playgrounds. While female appreciate more gathering family areas, natural features, playgrounds, and in general terms the image of the park; males appreciate a good skating rink, shaded areas, football fields, and the few fruit trees in the park. Furthermore, the cluster analysis shows that people perceive the park in two different dimensions: 1. Natural and healthy environment vs. built and unhealthy environment, and 2. Specific activity areas vs. multipurpose activity areas.

The workshop results show that people perceive borders of the park as dangerous areas. Playgrounds, floral gardens, and the abandoned channel stand as areas of opportunity. Finally they indicated that green natural and shaded areas are the most positive aspects of the park. In terms of activities, the park and immediate context need more infrastructure and equipment specially to stimulate exercise opportunities. Sitting areas are required, along with specific areas for teenagers or elders (which are usually incompatible). Participants suggest cultural, economic, environmental, and athletic activities such as theatre, dances, expositions, farmers markets, gardening workshops, and 5km runs, among others. A sustainable vision was outlined indicating the problems that need to be addressed from the social, economic, and environmental point of view. Participants pointed out that it is important to attend insecurity, addictions in the area, the

lack of activities for teenagers, the absence of local commerce, filthy areas, abandoned green areas, and implement a sustainable infrastructure to obtain the resources the park needs.

### **Discussion**

Final results show a gap between community's priority areas of intervention, government plans, and the experts' strategies. The literary review and urban studies understand that there are urgent lines of action that should be attended to improve the connectivity, accessibility, security, and sustainability in the park and the neighborhood. However, the habitants' perceptions represent the general expectations that will allow them to develop spatial appropriation towards their neighborhood. Understanding collective needs and creating awareness regarding environmental and social aspects will also encourage positive actions that could be implemented in the future. The fieldwork showed that people are eager to contribute and change the place they live in, in order to improve their quality of life.

Therefore, trying to bridge the gap between the official agenda, urban recommendations and the habitant's point of view, a guideline of intervention has been created. The aim is to present it to government agencies and stakeholders to discuss improvements in Los Alcanfores. These principles bring together the urban analysis, a sustainable vision, and the community's participation.

### **Conclusion.** *Guideline for future interventions.*

1. Improve the pedestrian connectivity in the neighborhood and with the city through the creation of linear parks that weave existing and new green areas.
2. Introduce cultural, educational, and sports equipment that encourage activities in the park and in the immediate context during the week.
3. Recover endemic vegetation of the place and implement urban gardens involving the community's participation. All age groups have specific tasks in urban gardens.
4. Open the park's perimeter creating a transitional space that connects the neighborhood. Urban lightning and neighborhood watch are strongly recommended to guarantee security.

5. Redesign areas in the park determining specific activity areas for teenagers and elders, and other multipurpose areas that reassure family and friends coexistence.
6. Introduce sitting and shaded space as design elements inside the park and in the green network that connects the neighborhood.
7. Eliminate rarely use landmarks and recover natural landscape.
8. Promote a sustainable culture through the creation of sustainable infrastructure, workshops, and activities that involve the community to guarantee spatial appropriation.
9. Revitalize the abandoned channel as part of the water system assuring a comfortable environment especially during summer. Water elements should be included as part of the system.
10. Redesign should highlight the dimension of natural and healthy environment over the built environment; permeability will promote a secure and transited green area.

These are the main points of the guideline that is currently under construction. A complex document will include specific aspects that should be attended to assure the efficiency and collaboration of experts and the community. Further research suggests meetings with government agencies and stakeholders to understand how the proposal could be implemented through public policies.

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