

## Superbarrio

### Gamification for Citizen Based Urban Design

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Responsive technologies, such as User/Gaming Interfaces, can offer to architects and urban designers a tool to enhance participatory design processes as well as a tool for evaluating existing planning or future design decisions. At the Institute for Advanced Architecture of Catalonia (IAAC) in Barcelona, we developed the app *Superbarrio*, which uses responsive technologies for the creation of participatory urban design processes by acquiring qualitative and quantitative data on the process of technologically mediated design participation. Our work was developed on the basis of an extensive urban planning analysis, which later informed the development of a digital platform.

The case study for the development of the *Superbarrio* app was located in Barcelona in the Superblock area. Known in Catalan as Superilla Pilot and currently, under development, it represents the pilot project of a broader urban regeneration plan within the Urban Mobility Plan of Barcelona 2013-2018. The plan aimed at reducing the emissions in the urban area of Barcelona, by closing two-thirds of Barcelona's roads from traffic in order to increase the areas dedicated to pedestrian mobility, social activities, and vegetation. The Superblock represents the minimum module of the plan's entire area of implementation, a three by three block area in which the internal traffic is dedicated to residents and local business owners by limiting the speed of vehicles in the area and externalizing the traffic flows to the streets surrounding the area.



*Fig. 2. The area of the Superblock is a 3x3 block area in the heart of the Poblenou neighborhood - Barcelona's innovation district.*

Our aim at IAAC was to evaluate the possibility of using gaming platforms as tools that enhance a citizen's participation in the design process of the Superblock. Our goal was to develop a game that acts as a channel of communication between the designers, the stakeholders and the users of the projects, allowing citizens to give inputs on their needs and design intentions. The interface allowed the citizens of the Superblock to visualize their neighborhood in a 3D environment and modify it by generating different design proposals for the public space while receiving quantified information on the impact of their design proposals on the neighborhood. This allowed us to collect a significant amount of quantitative/qualitative geolocated data of the users' desires and needs which we were able to visualize on a map of the neighborhood. The game was tested in a launching event in March 2017 with citizens who resided, worked or simply happened to pass by the neighborhood of the Superblock. With the assistance of an instructor, they played the game and generated a first dataset of citizen desires about the Superblock.



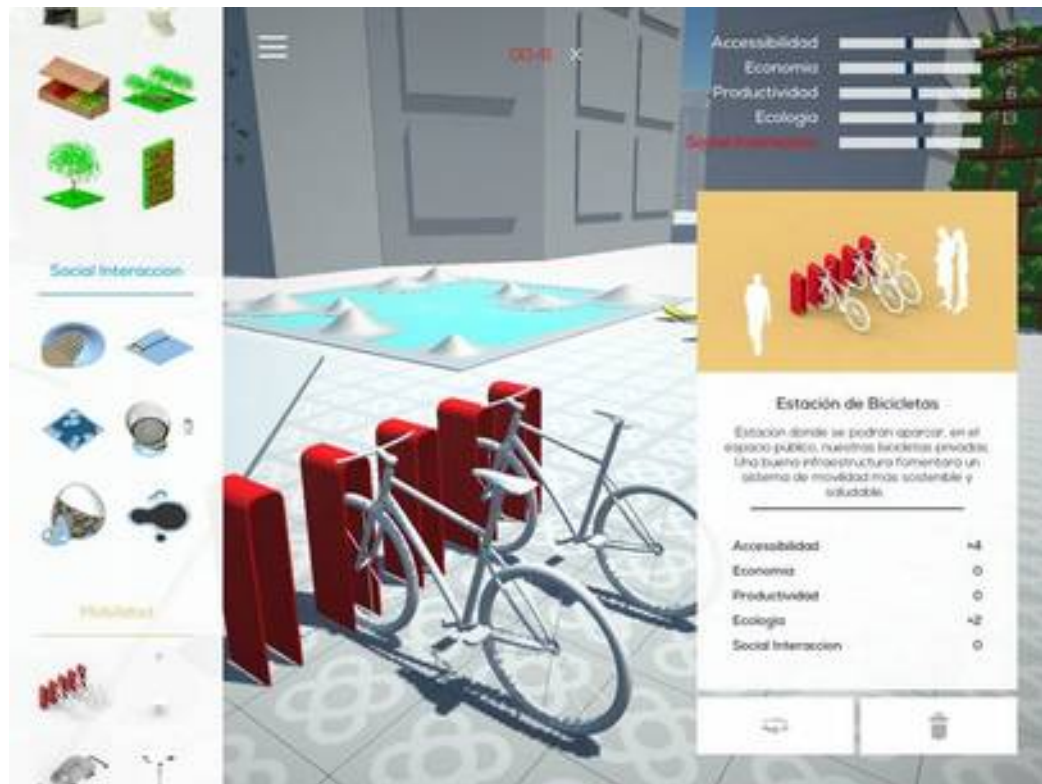
*Fig 3. The Superbarrio Gaming Interface.*

Our research at IAAC began with a conventional survey given to the people of the area, both residents and workers, collecting information about their opinions, needs and desires on the topics of 1) mobility, 2) social interaction, 3) ecology, and 4) generation of energy. Participants were asked to also share personal information such as age, gender, and place of residence.

Through the information extracted from these surveys, we generated a series of 3D modular elements that the users could place in the virtual urban environment. The entire neighborhood was modeled in 3D with a certain accuracy to allow the neighbors to visualize and recognize their houses and spaces.

Each element belongs to one of the 4 categories listed above and represents a functional program for the public space, including greenery, energy devices, alternative vehicles, leisure devices and more (Figure 4). Thanks to a system of score and metrics players can see the impact that each module has on the neighborhood. Each module generates a positive or

negative variation of the metrics to show the impact on accessibility, economy, productivity, ecology, and social interaction. Text notifications encouraged the players to keep a balance between the different values, in order to help them understand the implications of their decisions, and consequently the design implications of the actual project, hinting towards the underlying complexity of an urban design proposal.



*Fig 4. Example of interface elements, including bike stations, energy generators, greenery, etc.*

The data collected during the launching event of the app was in cases significantly different from the dataset of the first survey. An interesting example is that even though during the first survey the majority of the neighbors (60%) expressed the desire to have more car parking spots, using the interface the number of parking spot modules placed in the virtual environment was not significant. This difference in behavior might have been caused due to the difference in the awareness that the players had on the impact of their design decisions.



*Fig 5. Instructors explaining the game to the players during the launching event.*

A core feature of the gaming interface is the possibility to collect the data generated by each player, send it to a server, and generate a consistent dataset about the user's identity and design proposals. This dataset, continuously updated by the neighbors who download and play with the application, is constantly feeding and being visualized on an online data analytics dashboard.

The different modules placed by all the players are visualized on the map of the Superblock and on different diagrams in order to show the aggregation of the different proposal. The dashboard allows to filter this data according to the profile of the users and the details of the public space: age and gender of the player, used elements and categories, areas where the elements have been placed.

The possibility to visualize and filter the different proposals allowed us to read patterns related to the interests of the citizens, generate maps and relate them to specific user profiles. This platform represents, therefore, a useful tool to understand the users' needs. The unstructured and feature-rich database, as well as the real-time tracking and sharing platform, are both open, giving accessibility to all other public or private platforms through their own API, allowing a seamless collaboration potential.





Fig 6. Visualization platform dashboard

The metric systems represent one of the most interesting points of this project as a significant variation was observed in the behavior of the users in their effort to keep a balanced score. This immediate feedback enabled more informed decisions from the users while it also educated them on their decisions' impact on the virtual neighborhood.

It is also valid to state that these features can allow the designer to be a mediator between the users and public entities that are promoting urban regeneration processes, allowing them to inform the public on the benefits of urban interventions by gamifying the process of urban planning. On the other hand, this approach allows a two-way communication channel, since through the users' inputs the designers and stakeholders can identify the users' needs and desires. Although the initial sample of players was relatively small (around 50 players), we are currently working with the municipality of Barcelona to attract more players in order to produce more concrete results. Nonetheless, this initial experimentation also demonstrated the significance of using gamification technologies to understand and communicate complex social situations of such nature.

Since Barcelona's Superblock pilot project, the *Superbarrio* app has been tested in 2 more case studies in Italy, in the cities of Genoa (Fig. 7) and Favara (Fig. 8)

*Fig 7. The Superbarrio Genoa Gaming Interface.*



*Fig 8. The Superbarrio Favara Gaming Interface.*

*Superbarrio* reveals new ways of architecture and participation in the urban realm as both architects and users can have an active role as co-designers of urban relations, behaviors, and operations. It shows that gaming and responsive technologies of Virtual and Augmented Reality become a tool for the designer for sharing and evaluating the design process through the user's feedback.

*Superbarrio* shows the importance of rethinking existing processes and logic in participatory design. The use of responsive technologies opens up the possibility to reestablish the user as the center of the urban design process. They empower the user to change, customize and adapt the environment in real time, crossing the limits of physical artifacts and traditional drawings. At the same time, such tools allow for a bidirectional raise of awareness. On one hand architects, urbanists or decision-makers can educate themselves on what people need and wish and on the other hand, users are being educated on various design possibilities as well as on the global impact of their decisions.