

## **The use of geovisualization as a tool for citizen participation in urban planning development**

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The Brazilian City Statute (Law 10.257) establishes the protection of citizen participation in urban planning. In practice, however, the methodological processes to effect this participation do not materialize. As an example of this statement, this study presents analysis of the second phase of meetings held for the citizen participation in Urban Consortium Operation Antonio Carlos East-West (“Operação Urbana Consorciada Antônio Carlos Leste-Oeste”). These meetings occurred in the first semester of 2015 in Belo Horizonte, Brazil. The theme of these meetings was the participation of an experts group for studying urban parameters to be adopted in the above mentioned Urban Operation, which among other relevant areas of the city includes the region of Pampulha.

The process of assembling this Urban Operation has gone through several levels of planning and citizen participation. In previous version it suffered serious criticism from popular movements and since 2014 the City Hall started to discuss it in public conferences as a way to legitimize this urban instrument. In early 2015, the City Hall has promoted specific meetings to deal with urban parameters to be adopted by the Urban Operation.

This case concerned the authors of this article mainly because the first author researches for her PhD thesis the visualization of urban information, with an emphasis on participatory planning processes. Added to this fact, the investigation object is the proposition and suitability of urban parameters. Finally, this case interested the group because the area in question is the pilot case study elected by the authors in previous

researches, and so there is database and GIS available, favoring analyzes and interpretations.

From these initial motivations, the group decided to participate in the aforementioned meetings organized by the City Hall in order to understand the process of drafting legislation based on the participants' perception about the possible impacts of the proposed urban parameters. In other words, the researchers tried to ensure if the participants took part in fact, checking, for instance, if they could assess the possible changes in the landscape and urban dynamics that the proposed legislation could cause.

To conduct this investigation it was decided to use geovisualization tools. According to Masala and Pensa (2014, p. 160), the use of geovisualization can be an important planning tool to overcome representation of pure data and contribute to deepen the understanding of relationships between the data and its impact on the modeled landscape. Therefore, during a specific meeting in which it was demanded an effective review of parameters by the participants, the group sought to: (i) study the pure data presented by the City Hall (ii) model this data using georeferenced simulations and geovisualization tools and (iii) present this modeling to the participating group during the discussions process.

The methodological construction of the case sought the expansion of the data base shared by the participants in the mentioned decision making by the use 3D and 4D geovisualization tools. These expansions included, for example, possible projections of the landscape to be built throughout time and the insertion of modeled "templates" (maximum tridimensional space on a lot within which the structure must be built) according to urban parameters established by the law. In turn, the inclusion of diachronic 4D geovisualization sought the simulation of future projections of the urban landscape authorized by law. In general, the tools used for the data modeling were City Engine, ArcGIS, SketchUp and Excel.

As main results, concerning the methodology, it was verified a possible adjustment for future investigations. The modeling of new parameters for the listed city blocks was done according to the worst case scenario, as if the whole area would have been transformed. This caused a negative impact on the participating group. According

to Bosselmann (2008) in cases like these modeling of new volumes must be performed gradually, i.e., in varied and gradual insertion scenes. However, it is important to remember that a radical change of scenery, although unlikely, is possible in fact once it is authorized by law, especially in a country like Brazil, where the real estate dynamics has great strength. Thus a participant, being an expert or not, in a meeting that determines urban parameters should be fully aware of the worst case scenario.

Other relevant reactions to the presented study were (i) the modeling helped to build different views and opinions of the involved actors, even generating disagreement between them, (ii) some members of the City Hall, the organization that proposed and developed the initial parameters, were surprised when viewing the modeled parameters. These indications point out that, in fact, the geovisualization can contribute to building the endorsement of the participants giving support to participation in urban planning processes.

According Cota and Costa (2008, p. 154) it is not in nature, but in the manner the Urban Operation tool has been used in Brazil that can consolidate its perverse character. Citizen participation in urban planning should not be given only by the presence of participants, experts or not, but by the effective participation of conscious actors with voice, vision and tutelage over the parameters that build the urban landscape.

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