

Contextualizing OpenStreetMap in Mapping Favelas in Brazil

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About 6% of Brazilian population lives in Favelas [1]. They are characterized by their informality and precariousness of their physical structures, and by the social vulnerability of their population, as well as by their dynamics since they expand or change rapidly [2]. These characteristics impact on the outdated or lack of geographic information while there are demands for them to support the development of these communities [2].

Research that systematized knowledge about the mapping of spaces that are precarious and socially vulnerable, such as favelas, began in the 1990s. At first, the mapping techniques used were commonly referred to as the Participatory Geographic Information System (PGIS) [3] and Public Participation Geographic Information System (PPGIS) [4, 5]. From the technological context of the world until the mid-2000s, PGIS and PPGIS used analogic tools or Geographic Information Systems [6]. Web 2.0 provided new tools that can be applied to mapping favelas, such as OpenStreetMap [6]. However, it is still necessary to explore these tools within the limitations presented by the reality of the favelas. Therefore, this research aims to describe the collaborative mapping processes using OpenStreetMap in the context of favelas.

The notes that we made in this text were obtained from a case study with residents of six favelas (with a total population of about 15,000 people) and volunteers of a social organization - TETO Brasil, working in emergency housing construction and other activities in vulnerable communities. These communities are located in the Curitiba Metropolitan Region (Brazil), with about 2.5 million inhabitants. Thus, we applied a questionnaire to these volunteers to describe their profile and its relationship with the context of geographic information. In the case of residents we use data obtained by the NGO itself in its census process. In addition, to complement the research, we conducted a participant observation with these groups of people during the mapping activities conducted in 2017 and 2018. We analyze these data in order to first describe the actors and actions that influence them in the mapping process. In the analysis we consider both humans and nonhumans as actors.

As for the actors involved in the mapping processes with OpenStreetMap in favelas, we highlight the role of mediators. They are intended to support citizens in the use of tools and devices for the execution of mapping processes. Citizens of favelas, agents of NGOs, universities or other organizations can act as mediators. However, they need a previous

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training of the mapping process, regardless of whether an internal or external actor to the slums. In the case of mediators, even if they have mediation skills with communities, it is not common to have the same skills for technical mediation in cartography.

In the mapping of slums, besides the mediators, other actors are the citizens. Three notes can be made about their participation. The first is the motivation to start a mapping process. We realize that the motivating factor must be linked to an activity with potential benefit to the community, such as an infrastructure project. The second note is the representativeness of the group. It makes the map include a meaningful view of the community and is influenced by the first item described, motivation. In practice, it is seen that this participation is not obtained homogeneously in all favelas. The third note is that participation is conditioned to space and time in which the mapping occurs. In favelas, these may occur in community meeting places or open public spaces in these communities. In the existence of support of external actors, there is the possibility of mapping in a remote and sometimes asynchronous way.

In the case of favelas, smartphones are widely used by the population, being a viable and important tool for mapping. They are used by approximately 50% of residents to access the internet while other devices at most 20%. In addition, paper maps are frequently used tools in mappings. However, because of their lack of knowledge of these tools by citizens and mediators, training on OpenStreetMap tools is required.

Due to the characteristics of OpenStreetMap as an open database and the favelas being sensitive and conflicting spaces, it is necessary to consider some reflections regarding the privacy and security of the content made available on these spaces. In the absence of addresses or generic reference points, it is necessary to use abstract or personal references, such as the house of community leaders or known residents, or the indication of buildings that have unique characteristics. This information does not fit into the OpenStreetMap proposal, however, it is important for the use of favelas maps. Finally, using OpenStreetMap to create spatial information in favelas in conjunction with locals requires a lot of care, but this project has shown that its application is possible and can reduce the cartographic invisibility of vulnerable populations.

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