

What could perceptive and sensitive mapping be used for? Examples of use in urban planning projects

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Maps are a common and respected reference source for located information. A historical inventory of the objects designated by the term *map* shows the diversity of their media, shapes, sizes, orientations, information portrayed, symbols used, etc. Contemporary maps, in particular topographical maps from national mapping agencies or road maps, show that some of their characteristics such as orientation, categories of information displayed, mapping conventions have stabilized while demonstrating their ability to represent an immense variety of landscapes. An almost unlimited and also standardized cartographic offer exists. However, proposals and applications for alternative mapping have been developed. They are based on varied uses of the location and of display of information, which are different from that usually mapped. These approaches claim to be based on perceptive and sensitive mapping, or if they do not use this term, they rely on concepts and methods that connote this approach. The objective of this article is to analyze the contexts in which perceptive and sensitive mapping approaches can be used in a profitable way and then to characterize their use. The analysis is based on experiences in teaching and research settings involving urban planning students.

A state of the art of alternative mapping and sensitive mapping

A state of the art of alternative mapping and sensitive mapping shows that their main objective can be defined as a change of perspective and an extension to already existing knowledge related to space. Some situations correspond to a change of perspective. Indigenous cartographies aim at recognizing the rights of indigenous populations based on geographical elements and territory uses, different from those considered legitimate by the states, as in Hirt (2009), Kelly et al. (2017), Wainwright (2019), and Mackenzie et al. (2020). Changes from cartographic convention enable to also change perspective on territories: the south on top and the projection centered on Australia (Hobo-Deyer projection) as on the map of S. McArthur¹ (1979), the non-Palestinian territories represented in blue (conventional color of the hydrography) to insist on the Palestinian "*archipelago*" in the map of J. Bousac², the flow portrayal for migratory movements in Bacon et al. (2016). Addressing pieces of information that were previously considered non-legitimate or non-explanatory has two consequences. Firstly, it makes it possible to explain phenomena or to make territories visible in a new way. Secondly, it emphasizes the need to portray data that are not usually mapped. Following D. Harvey (1935) and W. Bunge (1928-2013), radical cartography³ adopts these key ideas. It bases its productions on a geopolitical and often militant analysis, as in Mogel and Bhagat (2010). The radical cartography does not reject the principles of the graphic semiology of Bertin et al. (1983) but questions, denounces or reverses the data selection and portraying conventions that shape our image of the world. So, maps become "*instruments of political and social emancipation*" in Zwer and Rekeawicz (2021).

A lived territory

Urban planning aims to take into account the opinions and feelings of the territory users into the definition, implementation and explanation of the projects. In this context, perceptive and sensitive mapping approaches enable the collection of users' opinions and feelings. As in radical cartography, the objective is to increase available information. However, the ways are different; more precisely, the types of relevant information are expanded and the mapping rules can be adapted to these new types of information in order to better fit the specifications of the projects. The territory⁴ targeted by sensitive mapping approaches is used, perceived, traveled, through, and experienced; the knowledge sought is therefore based on users and their use of the space as in Ancion (2018), Grésillon (2013), Feildel et al. (2016). The information gathering

¹It can be seen at the following link: <http://idata.over-blog.com/1/40/38/18/mcarthurmap2.jpg>

²It can be seen at this link: https://polau.org/pacs/wp-content/uploads/2013/09/Archipel_Etat_de_Palestine_Julien_Bousac.jpg

³The maps in: *Atlas 2009, Un monde à l'envers*, published by Le Monde diplomatique, and those in <https://polau.org/pacs/> come from this commitment too.

⁴The areas involved, and thus the maps produced as outcomes of these approaches, often correspond to a much larger scale than those of radical cartography. The perceptive and sensitive maps are most often at the scale of the neighborhood, rarely at the scale of an entire city, even less a country (as a rarity in Didelon et al. (2011), or a continent.

can be done by means of a specific activity carried out in the area to be analyzed, or by using the memory of this area as in Yoshimura et al. (2020). The information requested concerns the users' perceptions, emotions, opinions, and feelings related to the space during its use. The uses, whether exceptional or regular, are varied: walking, contemplation or transit place, social, sports, cultural activities, etc. The issue is legitimizing non-permanent pieces of information, linked to an individual, unavailable and/or difficult to store in geographic databases, and giving up a predictable, constant, legitimate and a priori known use of space. To promote the receptivity of respondents, observation filters (i.e. a specific attention to sounds, animal presence, vegetation, etc., and connotative information, to the exclusion of all other pieces of information) can be proposed as in Bailly (1991). The implementation of these filters legitimizes the users' spontaneity based on experience; besides, the filters make it possible to get past the saturation impression of the place usual users who no longer perceive it in its details but only in the restricted uses they have of it. The filters encourage the respondents to question their own perceptions. They allow them to discover or imagine other space use ways experienced by individuals with different physical abilities, priorities, and interests (the perception filters can then be likened to a role play). Their relevance relies on the investigators' expertise; this one concerns urban planning, historical and sociological context of the area, mobility related issues, etc. It also enables investigators to identify, from the respondents' commentaries and inputs, other types of information relevant to the project as in Olmedo (2017), other types of users to be questioned in Depeau (2005) or Yaagoubi et al. (2012), other conditions of use related to short-lived circumstances (season, weather, specific events) in Heitz et al. (2018), Jolivet et al. (2021) or Le Mentec (2021), security in Velazquez et al. (2020).

Mapping of perceptive and sensitive data

The assumption that it is easier for respondents to draw a map than to describe in words, or by any other means, is an assumption that is quickly contradicted by the field surveys. Perceptual and sensitive mapping approaches often overcome this difficulty by setting up collaborative mapping as in Lardon et al. (2008) or in L  v  que and Ehl (2022). Whether the cartographic process is individual or collaborative, the mapping rules are modified or adapted because they are considered less imperative, when they are known. Moreover, the very nature of perceptive and emotional data (non-permanent, variable according to individuals, linked to the current psychological situation, etc.), makes it difficult to locate and outline them. As this data is rarely portrayed in conventional maps, its symbols are also to be invented, and without the weight of symbolization conventions (often unknown to the respondents). When a base map is not provided to the respondents as in Olmedo and Caquard (2022) or in Dewaele (2011), the spatial relationships between cartographic objects often deviate from physical reality. Several explanations are put forward. Firstly, the map is not thought through in its entirety before starting ; also, the mapped object locations reflect their uses, their connotations, the associations they arouse, etc., which influence their relative location perception. The process is based on the perception variety of the participants. It aims to combine their varied and not necessarily cartographic skills (fluent oral expression, empathy, ability to listen, explain, synthesize, conciliate, draw) to elaborate a shared graphic and cartographic knowledge of a territory, based on experience. By multiplying the possible roles in the mapping process and valuing all forms of participation, collaborative mapping is both a personal and collective creative experience.

Discussion and conclusions

The obstacles and limitations of the approach are both behavioral or cognitive, and cartographic. Perceptual and sensitive experimentation increases the amount of relevant data, expanding the types of collected data deemed relevant, tricky and honest. However, it can be difficult to analyze the users or respondents' opinions and perceptions, prioritize them and trace them back to the corresponding explanatory variables. The cartographic difficulties are related to the scale and its consequences on the information density. Indeed, the quantity of information to be locally mapped leads to a very high information density in some map areas, making it difficult to read and therefore requiring the removal of certain pieces of information or their imprecise location. Lastly, the perceptive and sensitive maps are not based on the closed world assumption. The information, because it is non-permanent and subjective, cannot be collected or portrayed in a homogeneous way on the whole map. The assertion: "what is not represented does not exist" cannot therefore be applied Mocnik and Fairbairn (2018); consequently, it creates uncertainties and difficulties in generalizing the mapped information for the reader.

In conclusion, the interests of perceptive and sensitive mapping approaches stem from their features. The features and interests have been described in the context of urban planning projects and can be transposed to other types of projects. First, experiments based on respondents' ability to modify their uses of a territory, or their individual features (gender, age, acquisition of new physical abilities or loss of others, modification of their travel speed: by bicycle, on foot, in a wheelchair, etc.) can contribute to increasing the social acceptability of the planned developments. Secondly, these approaches aim at the co-construction of a territory through a plural process; it is carried out at the time of the diagnosis of the territory, of the definition, the explanation, the implementation of its development. In this context, the mapping process by respondents contributes to the appropriation of the territory and its development Binois et al. (2016). Finally, these approaches cannot do without expert knowledge, for example to define the features of the users to be interviewed, according to the objectives of the project. The mapping stage can also be facilitated by the intervention of a graphic design or mapping professional to clean up and finalize the respondents' collaborative mapping as in L  v  que and Ehl (2022) or to hold the pencil under their dictation during the collaborative mapping.