

Design

Emotional Maps in the Context of Participatory Planning - Examples from the Czech Republic, Spaces Semiotic-Ethnographies

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Introduction

In the Czech Republic, the decision-making process at local level has been historically very often elitist; closed to the public and non-participatory. At the same time, citizens have often been a neglected part of the planning process and considered only prior to elections (Galdós, 2010). Distrust of politicians has increased due to corruption scandals, mainly in the 1990s, and membership of political parties has never reached the levels of their Western counterparts (Howard, 2003). The neglect of citizen participation is slowly changing as local political representatives start to understand that citizens have a relevant role in the processes of town planning and administration (Čermák and Vobecká, 2011).

There has been limited research in the region of Central Europe concerning subjective and emotional maps as part of the processes of local planning, and almost no practical implementation of such approaches in local government administrations prior to 2010. Nevertheless, some examples of citizens acting as an advisory body in an e-planning process were observed in Poland (Jankowski, Czepkiewicz, Młodkowski, and Zwoliński, 2015), Hungary (Pödör, 2016) or Czech Republic (Pánek, Pászto, and Marek, 2016).

Reflecting on the historical context of the planning process in the Czech Republic, the author supports the idea that new participatory institutions could help to regain people's trust in democratic government. A set of innovative instruments, such as: participatory budgeting (Bhatnagar, Rathore, Moreno Torres, and Kanungo, 2003; Cabannes, 2004; Shah, 2007; Sintomer, Herzberg, and Röcke, 2008), emotional maps (Pánek *et al.*, 2016),

participatory urban planning [Kahila and Kyttä, 2009; Kahila-Tani, Broberg, Kyttä, and Tyger, 2015], open data [Jäppinen, Toivonen, and Salonen, 2013] and other measures to enhance transparency, could all contribute to democratic renewal across European cities. They could also lead to a fulfilling of the ideas set out in 'Local Agenda 21' [The International Development Research Centre [IDRC], 1996].

Concurrent with the elaboration of Local Agenda 21, the concept of the 'Healthy Cities Programme' was also developed and established by The World Health Organisation (WHO) in 1988. The programme is a long-term initiative with its main aims being to place health high on the agenda of decision makers and to promote comprehensive local strategies for health protection and sustainable development. It tries to bring the technical language of the 'Health for All' strategy into the 21st century and translates the principles of the Ottawa Charter for Health Promotion [The World Health Organisation [WHO], 1986] into tangible action. The Network of Healthy Cities of the Czech Republic (HCCZ) was created in 1994 and its mission, which goes hand in hand with the aforementioned premise of Local Agenda 21, is to goad Czech municipalities into stipulating in their statutes that they will consistently work towards sustainable development, improving health, and improving the quality of life in cities and regions of the Czech Republic. In 2014, HCCZ started to test implementing emotional mapping into their methodology for Local Agenda 21 workshops¹¹. The author of the paper works as a subcontractor for HCCZ and coordinates the emotional mapping workshops. Hence, the paper combines subjective testimony and experience with descriptive analysis of the process behind the development and deployment of emotional mapping in selected municipalities of the Czech Republic.

Emotional maps and Public Participation GIS (PPGIS)

Since behavioural geographers started working with place perception, and Peter Gould (1974) and Kevin Lynch (1960) used mental maps to explore city visualisation and spatial preferences, participation has become an integral part of the geographical research. Later, when Robert Chambers

¹¹ The *Forum of the Healthy City* activity is the first annual meeting between the local administration and citizens.

[1994a, 1994b, 1994c] and others introduced maps into 'Participatory Rural Appraisal', 'Participatory GIS' and 'Public Participation GIS', maps became further recognised by quantitative geographers as research methods and visualisation tools. Nowadays, with smartphones and global Internet coverage, applications like FixMyStreet, ArcGIS Online, CartoDB and Maptionnaire allow users to cross the technology gap and become neocartographers without the need for coding or even GIS knowledge. GeoParticipation, based on using spatial tools in order to involve citizens in community participation, can herald the future development of Public Participation GIS (PPGIS). This is because such a form of GeoParticipation provides social engagement and an easy-to-use environment, whilst creating the feeling of belonging to a certain social group or community (Pánek *et al.*, 2014). PPGIS research is considered 'applied' research as it is often driven by the need to identify spatial information that could be used for participatory planning and decision support (Brown and Kyttä, 2014). As such, it sometimes lacks the strong conceptual and theoretical background of basic research that would guide the empirical PPGIS deployments. Prior to the platforms mentioned above, the measurement and mapping of social and subjective experiences with place lacked the technology to capture the subjectivity of spatial information.

PPGIS started to emerge on the late 1990s with the first workshop on Public Participation in GIS organised in Maine (USA) and with the University Consortium for Geographic Information Science (UCGIS) meeting in 1998. In this period, the linking of GIS and Society entered the thus-far top-down and quantitative world of automated geography (Dobson, 1983) - later called GIScience (Goodchild, 2014). The scope of socially-related GIS applications broadened after the publication of thematic books such as: *Community Participation and Geographical Information Systems* (Craig, Harris, and Weiner 2002), special issues of academic journals (Cartography and Geographic Information Systems 1998, Cartographica 2001; Environment and Planning B, 2001, Journal of the Urban and Regional Information Systems Association, 2003) and conferences (Urban and Regional Information Systems Association [URISA] Annual Public Participation GIS Conference or International Conference on Participatory Spatial Information Management and Communication).

According to Dunn (2007), participatory approaches to GIS were also used in new areas such as: landscape planning and the revitalisation of public spaces (Craig and Elwood, 1998; Casey and Pederson, 2002; Elwood, 2002a, 2002b; Ghose, 2002), conflict resolution, land disputes and the exploitation of natural resources (Weiner *et al.*, 1995; Harris and Weiner, 1998; 2002; Kyem, 2002; Weiner and Harris, 2003; Kyem, 2004), entitlement of First Nations to land and access to public services (Bond, 2002; Laituri, 2002), environmental protection (Meredith, Yetman, and Frias, 2002; Sieber, 2002; Tulloch, 2002), and land-use and protection of natural heritage (Ventura, Niemann, Sutphin, and Chenoweth, 2002; Walker *et al.*, 2002).

Emotional maps can be considered as a subgroup of PPGIS (Brown and Kyttä, 2014) and at the same time, as a tool of GeoParticipation (Pánek *et al.*, 2014). Emotional mapping has the tools to support the ideas of Mody, Willis and Kerstein (2009), who state that emotions, spaces and places are interconnected, with every location capable of evoking an emotion. Places can thus be seen as attractive, boring, dangerous or scary, among other perceptions (Korpela, 2002). One of the first examples of emotional cartography in urban visualisation comes from the book of essays entitled *Emotional Cartography: Technologies of the self* (Nold, 2009). The book was described as ‘...a collection of essays by artists, designers, psychogeographers, cultural researchers, futurologists and neuroscientists, brought together by Christian Nold to explore the political, social and cultural implications of using technology to visualise intimate biometric data and emotional experiences’ (Nold, 2009: 3). Surprisingly, the publication has no essays by cartographers or city planners. This is despite the strong influence emotions have on how the (urban) environment is perceived and their effect on the spatial layout of the people’s perceptions (Zadra and Clore, 2011).

Emotions are one of the defining characteristics of every human being and yet their presence in maps and spatial data is uncommon (Griffin and Mcquoid, 2012). Some may argue that ‘emotional mapping’ is not the correct term, as it is not exactly *emotions* that are mapped, but merely people’s perceptions of and experiences in a place. Users are often asked to identify

places on the map where they feel afraid (mapping of safety), where they 'like it' (spatial preferences), where they spend their free time (leisure time activities planning), and where it is 'dirty' (environment pollution, etc.). This variety of spatial perception questions can hardly be considered as a homogenous emotional response to the place, but the umbrella term could be an emotional mapping. Some authors use terms such as sentiment mapping (Caragea, Squicciarini, Stehle, Neppalli, and Tapia, 2014), hedonic mapping (Ennis and Ennis, 2013), ephemeral mapping (Art and Cartography: Commission of the International Cartographic Association, 2015), perceptual mapping (Doran and Burgess, 2011) and many others. The theoretical discussions and uncertainty about the terminology show that emotional mapping research and practice is not clearly defined or anchored in its respective disciplines. Nevertheless, the author has decided to use the term 'emotional mapping', based both on the argument of Perkins (2009: 130), who states that '*...emotional maps...chart human feelings onto a cartographical landscape...and allow users to devise and customise their own emotional landscape, to choose what kinds of thoughts and experiences, feelings and passions, to map...*', and also as a legacy of the *Emotional Cartography* book by Christian Nold (2009).

Emotional mapping workshops organised by the 'Network of Healthy Cities of the Czech Republic'

The idea for the implementation of participatory map based questionnaires¹² came during the meeting of HCCZ network representatives with the author in 2014. The original idea was to develop a method that would allow participants of the *Forum of Healthy Cities* activity to spatially express their needs and ideas about city development. Later on, it turned into an emotional mapping workshop and web-based application that complemented each other and allowed the collection, analysis and publication of georeferenced subjective data as a part of the participatory planning/decision-making process.

During the process of testing, developing and deploying the emotional mapping workshops, the author tried various mapping techniques that

¹² Later this developed into the emotional mapping workshop.

produced a range of results. The very first map was created using six large crayons and one A1 map of the city (figure 8). The idea of using crayons came from the influential book by Robert Chambers entitled: *Whose reality counts? Putting the first last.* (2003). In this publication, the author argues, that development experts should *hand over the stick* (that which empowers) to let people draw their own maps. It was observed that it might be easy for a facilitator to hand over the stick to the participants, but it is not an easy move to share the crayon among the participants. There is always somebody who wants to take control of the tool and respectively, to take control of the map. The second disadvantage is the *overlay issue*¹³.



Figure 8. Example of the analogue emotional map created on the first emotional mapping workshop in 2014.

The second version of emotional mapping involved coloured pins (figure 9) that participants inserted into the cork-board with a map. It solved both the *overlay issue* as well as the *hand over the stick* problem. Participants can take as many pins as they want to, while several pins in the same location reveal hot-spots that are easily visible and also create a 3D effect on the map. Using different coloured pins, each colour represents a different emotion that when digitised into the georeferenced format, each coloured pin is represented as

¹³ If three or more colours are overlaid, it is merely impossible to identify the original colours.

a single point. This contrasts to the previous example, where combination of points, lines and polygons had to be used. The deflection from multi-format representation¹⁴ towards a points-only approach was based on difficulties with combining multi-feature datasets in GIS. It was also based on the experience of other authors' research where up until now, the predominant methods for spatially-explicit preference mapping have been marking points for locations or sketching polygons annotated with expressions of preference (Jankowski *et al.*, 2015). Brown and Pullar (2012) provided one exception to this in their suggestion that points instead of polygons be used in future PPGIS applications, although their study was focused on mapping large-scale landscape values. Furthermore, there was a possibility to use fuzzy multi-point features (Huck, Whyatt, and Coulton, 2014) to collect the information, but the author decided to use single points only as he experienced that points are often more specific and place related than polygons or multipoint features. The author also anticipated that it would be technically very complicated to do fuzzy-multi points with pins in the analogue version.



Figure 9. Example of using colourful pins for creating the emotional map in 2016.

¹⁴ Combination of points, lines and polygons.

The latest improvement in the emotional mapping workshops organised by the HCCZ is linking each pin with its author via numbers on pins (figure 10) and comments, written with same number code on the side. Thanks to this improvement, the data gathered via the online tool and data from participatory mapping meetings are almost fully comparable; hence they can be integrated into one large dataset.



Figure 10. Colourful pins with numbers used to identify the authors and link them with respective complains.

Besides the participatory emotional mapping workshops, the author created¹⁵ a single-page web application (figure 11) using two main open-source JavaScript libraries; *jQuery* for basic user interactions as well as app control, and *Leaflet* as a library for map interactions. For production, the modules are concatenated with other libraries by Grunt Task Runner. The application can be configured with a JSON file containing basic map views, app steps and popup form content. The configuration file can be hard-coded or generated from a database at backend. The results from the frontend are sent asynchronously to the backend where it uses the authors' own simple Model-View-Controller (MVC) framework written in hypertext pre-processor (PHP) script language. The MySQL database is used for storing metadata from users and geodata are stored in the GeoJSON format. The administration is

¹⁵ Together with programmer Ondřej Růžička.

created with the help of the Cascading Style Sheets (CSS) framework Bootstrap and administrators are allowed to download the full metadata from MySQL, concatenated with GeoJSONs.

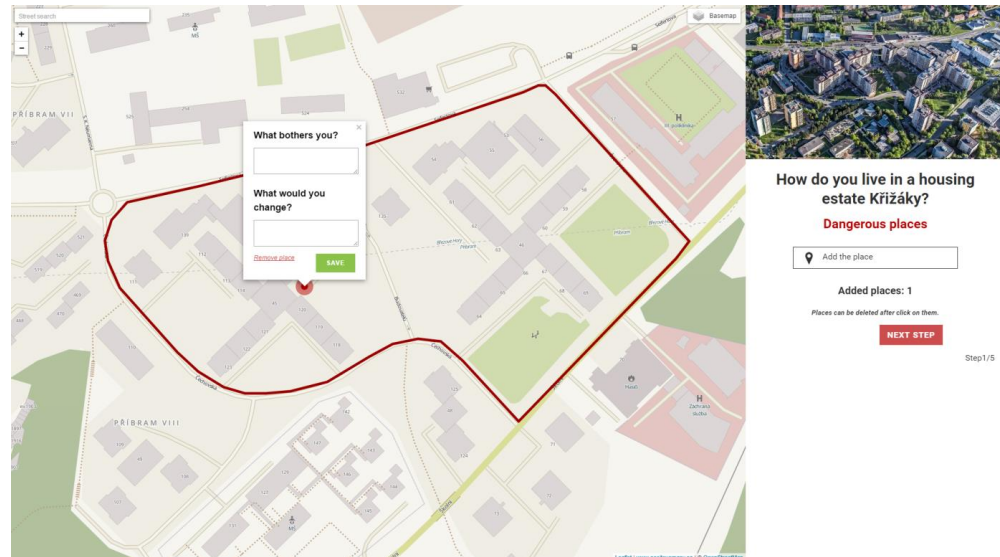


Figure 11. The environment of the web application created for the neighbourhood revitalisation plan participatory consultation in Přebíram, the Czech Republic in 2015.

Results utilisation by city administrations

The author asked municipalities that recognised the emotional mapping workshop in previous years to fill in the evaluation form in order to gather their knowledge and experience with the process. The response rate was 50%¹⁶ and the responses covered the period of 2010-2016¹⁷. In total about 2,500 participants¹⁸ took part in the workshops and based on the answers of administration representatives, the main motivations for cities to organise the workshops were for example:

¹⁶ 14 responses from 28 addressed municipalities.

¹⁷ One map is from 2010 (this map was not organised by the HCCZ), one map is from 2014, 6 maps from 2015 and 7 maps from 2016 (one city organised the activity in both 2015 as well as 2016).

¹⁸ Some cities estimated the number of participants.

- To find out how citizens perceive various places in the city, to determine which sites should be equipped with elements of leisure and where we need to focus on cleanliness and safety of the citizens.
- To ensure public participation.
- To use a new tool for finding the opinion of the population.
- To specify the places that citizens concern about.
- To reach out to the citizens in an innovative manner and to get one of the inputs for the implementation of the development strategy of the city from 2015 to 2020.
- To communicate with the public.

The emotional mapping workshops fulfilled the expectations¹⁹ of the municipality representatives who perceived the tool as suitable²⁰ for participatory planning and decision making. Most²¹ of the municipality representatives agreed that the emotional mapping workshop should be repeated every two years²². So far, the results or planned results from the emotional mapping workshop are/will be included in *Conception of urban transport, Strategic plan of the city development, Local Agenda 21 plan, or Action plan of Strategic development*.

The broad deployment of participatory geospatial tools in the Czech Republic is still an open question, although there is a legal and political framework for such actions. The first support for public participation came through European Union initiatives which promoted public involvement in local governance, including the 1998 Aarhus Convention [1998] and subsequently, the 2007 Leipzig Charter on Sustainable European Cities (European Commission, 2007). In the Czech Republic, participation is granted

¹⁹ 43% strongly agreed and 57% agreed with the statement “the emotional mapping fulfilled our expectations”.

²⁰ 64% strongly agreed and 36% agreed with the statement “the emotional mapping is a suitable tool for participatory planning and decision making on a local level administration”.

²¹ 10 out of 14.

²² Answers varied from every year to five-year period, but on average the answer was every two years.

by the Constitution of the Czech Republic as well as the Act of Parliament 128/2000 - Act concerning Municipalities (Czech Republic, 2000). Furthermore, some EU granting mechanisms even demand active participation during community planning process (such as Environmental Impact Assessment (EIA)). Nevertheless, based on the author's experience with organising emotional mapping workshops, the deployment of geoparticipatory tools often depends on the personal activity and involvement of municipality representatives and/or Local Agenda 21 coordinators.

Conclusions

In 2016, fifty members of the 'Network of Healthy Cities of the Czech Republic' organised the *Healthy Cities Forum* activity and 14 of them (28%), implemented the emotional mapping workshop within the event. This represents an enormous increase in interest in the mapping activity among the municipalities. HCCZ has 130 members, with regional influence²³ on the 2105 towns and cities where 5,454 million inhabitants of the Czech Republic live (52% of the total population). The potential of the emotional mapping workshop as a participatory planning support activity is therefore vast. Although the methodology may need improvement in academic grounding, it proved to be a playful and yet effective way to increase citizens' participation in the consultancy and/or decision-making process.

The methodological shift from crayons to pins in the analogue version of mapping was followed by technological improvements in the web-app. The crowdsourcing platform was continuously tested, de-bugged and re-programmed. During several case studies, the authors found bugs in: (1) the saving mechanism, which was not built for sending larger amounts of data (solved by improved caching settings), (2) drawing algorithms, which caused the unavailability of the *move* function once the *draw free hand polygon* function was used, and (3) the visualisation algorithm was not built strong enough to handle datasets comprising of thousands of points.

²³ Besides cities, also regions, micro-regions and local action groups are members of HCCZ.

The initial idea of using the heat maps for visualisations also proved to be inadequate, as these maps often covered vast areas of cities and did not provide specific information. The most important findings were sometimes merged and in some cases, created continuous areas that did not reflect the specific and unique findings. Therefore, another method was adopted concerning the visualisation of findings, and the hexagonal grid with *spatial join* function is currently used as main visualisation approach. This improved visualisation so far offered an increasingly clearer representation of the perception results. Furthermore, implementation of advanced geostatistical tools, such as non-parametric Kendall's rank correlation (Abdallah, Chorowicz, Kheir, and Khawlie, 2005), global Moran's I spatial autocorrelation (Moran, 1950) or local indicators of spatial association (LISA) methods (Anselin, 1995), may bring further insight into the data and provide even more specific answers on citizen perceptions of the city. The author believes that the demographics behind the data can reveal further information which would be relevant for e-planning research. The whole project of emotional mapping workshops works with open-source software²⁴ and open-data²⁵ only.

The roadmap and examples presented in this paper reveal both the development of the new methodology of participatory planning via map-based questionnaires, as well as opportunities and challenges that still lay ahead of its author(s). Besides the case-studies presented above and usage for participatory community planning, the tool has been deployed for: the mapping of bikers' satisfaction with transport infrastructure in Reykjavík, Iceland; mapping of safety perceptions in Olomouc, Czech Republic; and examination of geographical knowledge about the Middle East among university students. The author is confident that there are numerous utilisations and improvements for the tool, and invites various stake-holders to take advantage of the tool for their own research as well as participatory planning activities.

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²⁴ QGIS

²⁵ OpenStreetMap printed via <http://print.mapwebbing.eu/service>.

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