

Platform for Collaborative Problem Solving within the Citizen's Spatial Context - the *Geo-Citizen* framework

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Abstract

Citizens are very valuable observers of problems and conflicts that occur in their own living environment. In order to empower them to be part of the solution, especially in regions where the government lacks information, administrative power and transparency, the *GeoCitizen*-framework allows citizens to identify, report, discuss, solve and monitor problems related to spatial planning and community services using a platform that merges geo-web technologies and social media in one single, comprehensive and interactive tool for participatory spatial planning at a local level. It establishes an open access entry point for every citizen to identify geographically a problem, connect to a thematically specific problem solving process, find collaborators in their neighborhood, get informed regarding the spatial context of the problem and related conflicts, reach experts and best practice role and process models, get aware of the spatially related synergies of both problem scopes and the resources for creative community based solutions, and share the ongoing efforts in a structured and standardized way within a common dynamic web-mapping framework with the public. GIS tools support the construction of problem focused local knowledge, and evidences the collective spatial decision making process by providing modern geo-services (e.g. ESRI ArcGIS Server technology). The *GeoCitizen*-framework and platform will be implemented and tested in different case studies in rapidly growing areas of urban sprawl in Quito, Ecuador.

1. Introduction and Problem Scope

In many developing and emerging countries, there is a lack of health- and security services provided by governments, transparent information policy about infrastructure projects, extraction and conservation of environmental resources, land tenure and land use management. Traditional spatial planning has been discredited as it is accounted for advocating inefficient, ineffective and even illegal projects and inadequate service provision resulting in a lack of legitimacy in the eyes of citizens (Rakodi, 2001). Marginalized communities that have no access to information and political networks are likely to be excluded from mostly not at all transparent planning processes. Public expenditures are often not located to where they are needed most urgently, and tend to lack a properly control by society (Resl, 2006). As a consequence, the potential to provoke conflicts between stakeholders in local and regional planning grows rather than diminishes, and can be observed mainly in the following areas: (a) territorial management and public services, (b) public safety, (c) public and individual transport and (d) public (eco-) health management (Steinberg 2005, Fay and Morrison 2006, Freire 2006, Irazábal 2009, Rodgers et al. 2011).

One way to attend these deficits in spatial planning processes would be sharing information directly to and between the affected citizens and communities. This could be achieved through a communication framework that constitutes a social network for citizens and their initiatives in order to let them participate in local and regional development in an organized and structured way.

Particularly the last decade has provided for a rapid development of geo-technologies, web-based online collaboration tools and social networks (Goodchild 2007, Rosser and Morley 2007). The *GeoCitizen*-framework

2010, Fischer 2012). The latter are available to an increasing number of users all over the world (Evans-Cowley 2010). These technological advances have given a new momentum to research efforts that focus on how the participation of citizens can improve governance (O'Reilly 2009). The 'crowd' nowadays is able to rapidly collect data and identify problems and shortcomings related to their living environment on the web in a transparent and traceable way, providing data that can be used in public decision making (Elwood 2008, Graham 2010, Bednarz and Kemp 2011). New developments in geo-technology provide the ground for 'spatially aware citizens' that are able to "interpret and critically reflect spatial representations, communicate [...] and express location-specific opinions with the aid of maps" (Gryl, et al. 2010, p.4). Based on the concepts of 'spatial literacy' and 'spatial citizenship' the geospatially-aided citizen is considered as a "growing tool for positive and productive engagement with improving and managing society" (Bednarz and Kemp 2011, p.19).

Over the last years a considerable number of participatory geospatial web-platforms have been developed that aim at improving the participation of citizens in spatial planning referring to the concept of good governance as a common ground of political action (Fu and Sun 2010). Local and regional governments started to offer geospatial web-platforms like FixMyStreet (<http://www.fixmystreet.com/>), SeeClickFix (<http://en.seeclickfix.com/>) or ParcScan (www.parkscan.org) to let citizens inform them about problems (potholes, graffiti, broken streetlights, etc.) in order to take rapid and appropriate actions. Crowd-sourced planning applications such as the San Jose Wiki Planning Project¹ allow users to take surveys, add comments and post photos about issues relevant to planning initiatives. Web 2.0 tools are used within crisis management (<http://ushahidi.com/>), public safety (<http://www.wildlifecrossing.net/california/>), public-health management (<http://westnile.ca.gov/>) and in similar applications within the environmental domain where citizens as observers have contributed to developing a broad understanding of critical environmental issues during the 2010 Deepwater Horizon Gulf oil spill in the Gulf of Mexico (Bednarz and Kemp 2011), just to mention a few examples.

Honouring all these efforts, but trying to take it step further, the implementation of the concept of 'social geo-communication' in participatory spatial planning would demand one single platform that fully integrates web-mapping tools and social media in a user-friendly environment. However, this is not the case yet, as the above mentioned platforms do not integrate proper tools for discussion and problem solving based on a collective endeavor to interact with both local and global knowledge upon their geo-tagged observations and reporting frameworks. The flow of communication between citizens and authorities tends to stay uni-directional. Therefore, an increasing number of scholars (Ramasubramanian 2010, Evans-Cowley 2010, Fu and Sun 2010) ask for an extension of these platforms by adding additional functionalities that allow citizens to engage in building communities, programming activities, and in finding sound solutions rather than reporting their complaints to central (planning) offices. That is where the *GeoCitizen*-framework comes in to foster both a "ground truthing", truly participative dialog driven dynamic planning and solution process on typically spatial problems that are or should be of intrinsic interest to citizens.

2. The *GeoCitizen*-framework

The *GeoCitizen*-framework provides the citizens with the opportunity to identify, report, discuss, solve and monitor problems related to spatial planning at a local level, merging geo-

¹ <http://www.govtech.com/e-government/San-Jose-Califs-Wikiplanning-Project-on.html>

web technologies and social media in one single, comprehensive and interactive tool for participatory spatial planning. It links citizens' observations and perceptions on their living space on a neighborhood scale and connects without any discrimination on a horizontal level communities, local initiatives, ordinary citizens, as well as experts and local authorities in order to find collectively proper solutions for spatially-relevant conflicts regarding their very specific living environment. By discussing spatial planning processes in public using the World Wide Web, power relations between citizens, public administration and other stakeholders ask automatically for a redefinition. As a consequence, spatial planning should not only become a responsibility for the citizens but should support more transparency and ultimately be legitimated by the affected citizens. Hence, this framework is designed to contribute to a more citizen-oriented, democratic and sustainable spatial planning and sound conflict management especially within marginalized communities in developing and emerging countries where transparent spatial planning is most urgently needed. The following key factors for a successful collaborative problem solving process regarding the citizens neighborhoods were considered for structuring a web-based platform: accessibility and user-friendliness, social inclusion, respect for local identity, wizard-driven standardized approach, spatial dimension with neighborhood focus in a global view, collaborative awareness building and planning incentives, problem oriented place and process specific social networking, responsible social control, historic views of all processes, spatial and thematic scope of citizens' observed and processed problems for any region at a glance, highlighting of best practice cases, integration and legitimacy of local knowledge, enhancement of local thinking towards global acting, problem definition and dynamic need-assessment by citizens, transparent and replicable solution finding processes that can be monitored and qualified individually by success, encouragement of qualitative and quantitative multi-criteria reasoning within a spatial context, understanding horizontal and vertical spatial relationships, structured argument processing with multimedia contents, easy cross-referencing of spatial and thematic views of problems, basic democratic approach on decision making, global view to local problems, integrated and context driven information management, time relevant and timely discussion on local problems, scale up context, healthy competitive incentives for best processes and best solutions, collective creativity, active learning environment by participating, learning by examples, learning to understand problems within their spatial context, spatial and thematic relationships, social dynamics and systematic continuous processing, self learning citizen driven platform with scalability and open architecture for integration of information, communicational, collaborative problem solving and planning tools, focus on bottom up coordinated approach challenging top-down decisions by valuable potentials of input from global network of experts and experiences. The suggested paradigm shift within spatially related problem management and planning relates to a potential transition from isolated centralized planning authorities and/or chaotic interest driven decision making to a self-responsible community oriented planning approach by a collective of citizens of the same neighborhood. The GeoCitizen-framework builds upon the notion that the complexity of a sustainable management of humans' living space requires a systemic, informed, dynamic and coordinated integration and continuous involvement of all actors, their very different and complimentary roles. Most of all, existing top down planning realms are challenged by and need a methodological approach. Last but not least, the framework questions the human dimension of governability in a globalized world, and stresses a move from an anonymous spatially unspecific management of problems to a locally aware known environment with very specific identity and mechanisms to deal with the very own living space and its conflicts catalyzing the for this dimension immanent forces of social control. The GeoCitizen-framework allows moreover for people and their organizations up to governments to be seen and acknowledged for their collective endeavor making their

neighborhood and by this probably another one a better place. Stuarts could find a wealth of places and situations to offer their support in a respectful and process oriented manner.

3. The *GeoCitizen*-platform

The proposed framework is currently implemented through a web-platform – the so-called *GeoCitizen*-platform - that allows:

- collective tracking of neighborhood related facts and problems by means of geo-tagging
- discussions about planning related spatial features (articulation, exchange, valorization)
- implementing solution building mechanisms (proposition, decision making, implementation, success monitoring)

Doing so, the *GeoCitizen*-platform provides a framework to communities and their members for exchanging their local knowledge, their everyday experiences and observations about issues related to spatial planning processes, based on geographical features located on an online mapping platform. These features are related to pre-structured categories and topics. Users can report a problem on the platform, upload pictures, videos and URLs in order to more precisely describe an observation and start a problem solving process. Reporting can be done anonymously upon user's request, whereas converting an observation to a problem requires authentication and compromises the user as the "owner" of the problem point. Problems and possible solutions are discussed in discussion forums, where user groups try to identify sound and sustainable solutions. These user groups constitute themselves by showing interest in one specific observation or a similar observation in another neighborhood or municipality. Users can join or leave the problem solving process according to their degree of concern about a topic or invite other people to participate. In their solution finding process they are linked to user groups in other neighborhoods and municipalities having the same necessities and maybe already providing solutions for the same type of problem as best practice examples. Upon request, each problem solving process is guided by a moderator that is usually the user that reported the problem but may also be another user or an expert, if the group agrees on that. The moderator designs questionnaires in order to collect specific information about the discussed topic within the discussion group, at public authorities and scientific institutions or deploys more sophisticated methods of (online-) consensus building like the Delphi-method. In addition, expert knowledge about factors that drive spatial planning on larger scales can be integrated, if desired. Doing so, the problem which causes a conflict is connected to the location where it takes place, its involved population and factors of regional, national and global context. After a minimum time period of discussing an issue, a solution is proposed by the moderator and the users agree on a final solution in an online-ballot. The identified solution can be presented to planning authorities, other community members and a broader public by traditional means of printed reports, by mail or through social networking platforms like Facebook and twitter. In order to be able to follow up or question whether appropriate measures for implementing a proposed solution have been taken, platform users can re-open an already finished process and can start a new discussion on the same topic. Spatial Tools within the framework or additional functionality simply called from the vast universe of available instruments from the WEB can help the user to retrieve more information on the spatial features and context discussed, and increasingly request also GIS functionalities to analyze, model and visualize spatial relationships and

processes in a very sophisticated manner. A very powerful connection for such extended tasks could be very well established by seamlessly linking a problem point and its environment to an ESRI ArcGIS for Server service, either on the Web or within a local network, which again connects to a diversity of worldwide available geo-enabled services. Local aspects can then also be fed back into a Global Spatial Database Infrastructure GSDI in an adequately structured manner enriching commonly retrievable standardized databases.

Very aware of this necessity to establish an integrated planning approach, the *GeoCitizen*-framework provides for these links to existing spatial knowledge combining the simple *GeoCitizen*-framework-frontend with ArcGIS for Server providing a full range of GIS server capabilities to transform the maps and data from stakeholders from governments, municipalities and other organizations which can amend the local knowledge stored in the system with information that simultaneously can be compared and analyzed by Web services and visualized as thematic layers on the platform. This should encourage ongoing discussions and the solution finding process. Social cohesion and control in the affected communities should be boosted through active participation and the share of responsibility amongst their members in place of simply reporting problems to planning authorities.



Fig.1 the *GeoCitizen*-Method

To make clear what it not is: the *GeoCitizen*-framework is not a ‘pure’ GIS, as it does not focus on a systemic approach to administrate spatial information as such. It is not a geo-locational service, as it does not restrict itself to a mapping procedure of single events. It is not a social network, as it does not part from spontaneous communication and interactions of user groups. And it is not an online survey, as it does not focus on retrieving information in a unidirectional way.

4. Case Study Application

As a first step towards a worldwide feasible implementation, the *GeoCitizen*-framework will be further developed and tested in different case studies in various municipalities and their neighborhoods of the Tumbaco Valley, Ecuador. This valley is located in the central Andean Highlands in the capital district of Quito and has a population of about 180 000 inhabitants. It has seen an explosion of housing and businesses activities over the last decade that dramatically increased the use of scarce land, traffic and environmental problems (World Bank, 2008). Badly managed urban sprawl and non-transparent planning initiatives often patronized by public-private consortia, have led to severe conflicts within and between communities, municipalities, regional and national planning authorities in Quito and other (private) players (Resl, 2006), what represents a situation typical for many growing urban areas in Latin America.

The *GeoCitizen*-platform will be openly accessible for the public. However, the project team will monitor the identity and behaviour of the users in order to prevent abusive use of the platform. Main partners in the case studies are the University San Francisco de Quito (USFQ), CBOs (Community Based Organizations) and especially the municipalities of Tumbaco Valley that will act as facilitators for promoting the use of the platform and coordinating affiliated participatory activities. The following categories related to spatial planning are covered: land tenure; land use; public services and facilities; transport; environment and

public safety. Background data that give additional information about the status-quo and planned projects encompass cadaster and land value, zoning, topography and environment, natural and anthropogenic hazards, public infrastructure and facilities, census and other socio-economic data. The platform will be available for desktop and mobile application. Preliminary results are expected for beginning of 2013. A pilot with limited functionality will be opened to the public of the first municipality of the Tumbaco Valley that showed interest in enhancing and improving their community work, by mid august of 2012. As a first attempt citizens will use the locally denominated GEOciudadano platform to map their commitment on social responsibilities within their own neighborhoods context and share their experiences via mail, and commonly used social networks and news channels. The idea behind this stepwise implementation is to control the usability of basic features provided within a very organized campaign stressing the proposition oriented character of the GeoCitizen-framework.

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