Cyborgs in the city: exploring opportunities and challenges for web-based PPGIS and 3D cities

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Summary

Web-based Public Participation GIS and 3D cities are slowly emerging as digital tools for public engagement in urban planning. They mediate georeferenced discussions of places and consultation about place-making projects and processes, thereby improving the knowledge base for decision-making in land use planning. Web-based PPGIS and 3D cities operate as 'cyborgs' or socio-technical 'hybrids', both as ontological objects and ways of knowing. Based on a purposive literature review, and interviews/questionnaires with a selection of planning experts and tool providers, this paper will explore opportunities and challenges for deploying web-based PPGIS and 3D cities.

KEYWORDS: web-based PPGIS, 3D cities, cyborg, participatory mapping

1. Introduction

Online tools and methods for public participation are increasingly used to engage residents in urban planning (Kleinhans et al., 2015, Khan et al., 2014, Kahila-Tani et al., 2016, Reinart and Poplin, 2014, Ertiö, 2015). Amongst these, web-based Public Participation GIS (PPGIS) and 3D cities enable the inputs of public participation to be explicitly georeferenced, which facilitates the spatial visualisation of citizen knowledge, views and aspirations about places. The increasing interoperability of both web-GIS and 3D city models allows georeferenced data to be shared across visualisation platforms, enabling the easy overlay of data produced by experts and residents so as to improve the knowledge-base for land use decisions by bridging expert and more experiential forms of knowledge about places (Kahila and Kyttä, 2009). Evidence suggests that web-based PPGIS have the potential to reach a broader number and range of people than more traditional modes of public engagement such as consultation meetings, focus groups, citizen juries or design workshops (Pánek and Benediktsson, 2017, Kahila-Tani et al., 2016).

Despite the potential for web-based PPGIS and 3D cities to improve the knowledge base for urban planning and support more inclusive and collaborative forms of public engagement, these technologies face significant hurdles. The digital divide, is a major obstacle to inclusion in society, e-Government services and e-Governance more generally to web-based PPGIS and 3D cities (Crutcher and Zook, 2009, Czepkiewicz et al., 2016, Gottwald et al., 2016). Other obstacles can include institutional barriers such as red-tape, organisational and professional cultures that are distrustful of collaborative planning practices and innovative technologies, lack of public interest in planning matters, and public distrust of local planners and decision-makers (Brown and Kyttä, 2014, Slotterback, 2011, Woodcock et al., 2012).

The academic literature is also lagging behind actual experiences with web-based PPGIS and 3D cities. Most literature seems to concern pilot studies or isolated real-life projects (Billger et al., 2016, Wu et al., 2006, Bugs et al., 2010). Many commercial applications that have been deployed across a wide range of planning contexts do not seem to be covered in the literature.

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2. Methodology

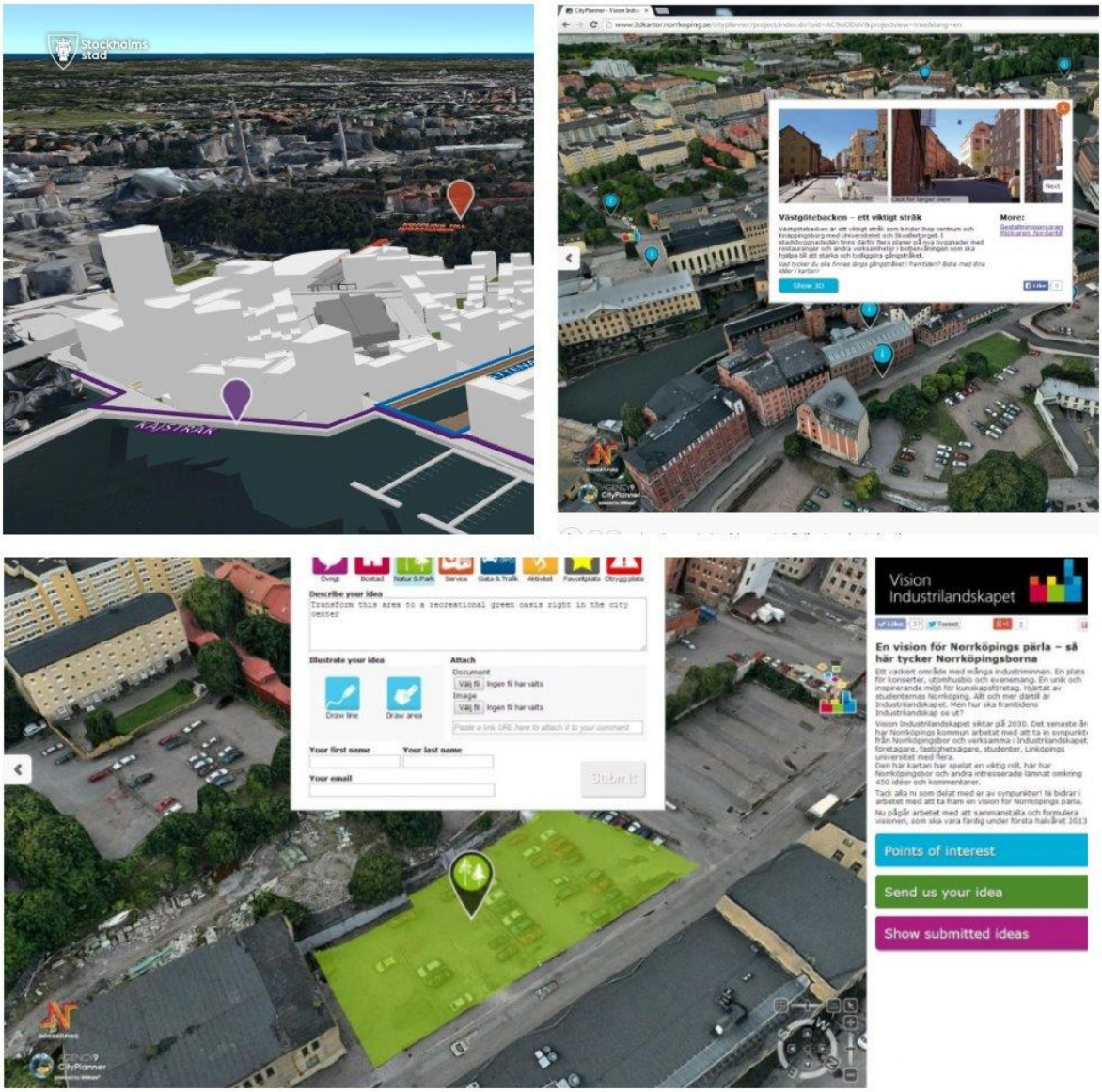
The exploration of opportunities and challenges for the deployment of web-based PPGIS and 3D cities builds on a purposive literature review as well as semi-structured interviews and questionnaires of a selection of planning experts and tool providers. Preliminary insight about opportunities and challenges surrounding the use of web-based PPGIS is derived from former work (see Babelon et al., 2016), featuring empirical data from case studies in Sweden. Pending data collection concerns the use of web-based in countries PPGIS in France, the UK, and/or Australia, as well as the use of a 3D city platform for public engagement (CityPlanner) in local councils in Sweden. The data collection will be purposive rather than systematic or extensive, so as to explore some of the main perceived opportunities and challenges for deploying the tools in local contexts. This paper is part of the state-of-the-art for a PhD research that will compare web-based 2D PPGIS and 3D cities for public engagement from a usability perspective, with 2-4 case studies located mostly in Newcastle.

3. Web-based PPGIS: examples

Most web-based PPGIS applications covered in the literature concern usability pilot studies and one-off applications that have been used in real-world planning contexts (e.g. Bugs et al., 2010, Poplin, 2012, Meng and Malczewski, 2010, Jankowski et al., 2015), with notable exceptions (Brown and Kyttä, 2014, Kahila-Tani et al., 2016). This paper will focus on the use of web-based PPGIS that have not covered or have been addressed in the academic literature. Among those tools insufficiently addressed in the literature is Bästa Platsen (see Babelon et al., 2016).

4. Web-based 3D cities: examples

A number of 3D cities for public engagement have been developed to this date (Dambruch and Krämer, 2014, Wu et al., 2006). Despite great technological potential, only one identified highly-interactive 3D city platform has been used in multiple real-world participatory planning contexts. Below are sample uses of CityPlanner in local councils in Sweden.



Sample functionalities of CityPlanner in Sweden. Courtesy of Agency9.

5. Cyborgs in the city

The performance of web-based PPGIS and 3D cities depends on a wide range of socio-technical factors that go well-beyond the applications themselves (Sieber, 2006, Roth, 2013, Brown and Kyttä, 2014). Web-based PPGIS and 3D cities can be viewed as 'cyborgs', or socio-technical hybrids (Babelon et al., 2016). The cyborg as an organism fuses human and technological features. Likewise, as ontological objects of enquiry, web-based PPGIS and 3D cities hinge on a host of socio-technical factors which can hardly be separated from one another. Beyond their ontological hybridity, web-based PPGIS and 3D cities also mediate hybrid ways of knowing: they enable collective learning and dialogue about how places are used, viewed and managed and thereby allow to bridge expert and lay rationalities (Kahila and Kyttä, 2009). They can mediate both qualitative and quantitative forms of knowledge simultaneously. The 'soft' experiential data produced by residents (Rantanen and Kahila, 2009) can be aggregated and spatially analysed, and planning experts can easily communicate planning constraints and orientations to urban residents.

It is expected that the capacity of 3D cities to function as collaborative urban information systems (i.e.

enabling to visualise project management, planning strategies and projects, open data and inputs from public participation as multiple layers in a single dynamic visualisation platform) will lend itself even more to cyborg conceptualisation in the near future, both ontologically and epistemologically.

6. Biography

Ian Babelon is a PhD researcher at Northumbria University, with interests in participatory mapping, collaborative planning, ecosystem services and renewable energies. His academic background is in anthropology, human geography and urban planning.

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