

# Participatory Mapping and PGIS: Secerning Facts and Values, Representation and Representativity

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## ABSTRACT

Applications of participatory mapping (PMapping) and PGIS to the mapping of local spatial knowledge are expanding; therefore, updated ethics and good practice improvements are needed. The intention here is to discern, or distinguish between, two pairs of concepts essential to PMapping – between ‘facts’ and ‘values’ in the knowledge being mapped and between ‘representation’ and ‘representativity’ in the Pmapping processes. Local spatial knowledge is not homogeneous; facts and values are distinct although intrinsically related. In a world of ‘fake news’ and attacks on science, it is even more essential to distinguish facts from values in maps and other media. Concerning representation of both facts and values, the questions are how to represent local knowledge. Concerning representativity in the process, whose local spatial knowledge is being presented, and why? PMapping is not democratic; it is exceptionalist and informed – that should be acknowledged as a strength, not a deficiency.

## KEYWORDS

Authenticity, Democracy, Fake News, Good Practice, Local Spatial Knowledge, Participatory Mapping, PGIS, Representation, Representativeness, Trust

## 1. INTRODUCTION - FRAMING THE ISSUES

Applications of participatory mapping (PMapping) and PGIS to the mapping of local spatial knowledge (LSK) are growing apace, therefore their ethics need review and appropriate good practices further developed. The overall intention of this paper is to discern, or distinguish and discriminate between, two pairs of concepts essential to participatory mapping, firstly ‘facts’ and ‘values’ as components of the knowledge being mapped; and secondly, ‘representation’ and ‘representativity’ as parameters of the processes of the participatory mapping. The article interrogates these concepts and explores their implications employing a methodology of critical review of conceptual material from critical cartography, Citizen Science, Post Normal Science and many field experiences of PMapping.

The research issues here follow. Local spatial knowledge is not homogeneous, the knowledge includes facts and values which are not synonymous. They are distinct, although intrinsically concatenated. It is essential to strive to distinguish facts from values in participatory maps (as in

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other media) to avoid that PMapping might generate and deliver products based more on values and feeling, than on facts. This is especially significant now in a time of ‘fake news’ and sceptical attacks on science. Representation in participatory maps (PMaps) for both facts and values is contestable - ‘what LSK to present and how to represent it?’; whilst the primary issue of representativity (or representativeness) is ‘whose LSK is being represented?’

Participatory Maps and Participatory Mapping refer to ‘maps’ (representations of spatial information) made using participatory processes by a community or groups of people. They are grounded in local interests and needs and (spatial) knowledge, and they employ an array of different mapping and elicitation tools - they are an ‘approach’ rather than a specific method (Brown, 2012; Chambers, 2006; CTA, 2010; Dunn, 2007; McCall, 2003; Rambaldi et al., 2006; Sieber, 2006).

The first section of this article visits the four roots of participatory mapping (PMapping)<sup>1</sup> and its ethical frame. The four roots, the ideological drivers behind the turn to PMapping, are: firstly, good governance through increased citizen participation, which includes principles from Citizen Science and Post-Normal Science (PNS)<sup>2</sup>; secondly, an essential component is critical spatial knowledge - people’s knowledge which is often subversive; thirdly, the recognition that people’s spatial knowledge has validity and value; and, finally, the rapid development of appropriate, affordable, user-friendly geographical information technologies. The second section focuses on the core content of PMapping, which is *local spatial knowledge* (LSK) and its valorisation. LSK is the primary categorial object and thus the primary element in the practice of PMapping. It is essential however to distinguish between two components of LSK - ‘*facts*’ and ‘*values*’, and to recognise ontologies that link them. The structure and content of any PMapping exercise depend on the relative importance of each component in the activity. The next section interrogates two key problematic concepts that are contested in PMapping practice: - *representation* in PMapping, that is, how, and which, LSK items (facts and/or values) are shown, and *representativity*, i.e. whose LSK is being represented? The fourth section proposes elements of good practice in bettering representation and representativity. Finally, the conclusions reiterate that PMapping concerns both facts and values, though they must be handled differently especially in terms of trust. Regarding both representation and representativity, PMapping is not democratic; the strength of PMapping - not a deficiency - is that it is exceptionalist, extra-ordinary, and informed.

## 2. VISIONS DRIVING THE TURN TO PARTICIPATORY GIS

PMapping and PGIS are a spatial variant of popular or ‘vulgar’ knowledge constructs and systems. At the roots of Pmapping, four main visions underlie the ideology, ethics and methodology. The drivers behind these visions will first be considered in general to show how they translate into implications for spatial or geographical phenomena. These visions are necessarily inter-connected and synergistic.

### 2.1 “People’s Participation” and Democratization

Promoting participation is a principle in decision-making that can be traced to the late 1970s and 1980s in a universal drive towards greater decentralisation, accountability, and popular democracy (e.g. Cavalier & Kennedy, 2016; Cooke & Kathari, 2001; Haklay, 2013; Hickey & Mohan, 2004). People’s participation is taken as an activist, progressive drive towards democratisation and empowerment. It is intended to strengthen feelings and narratives of agency in the public, that is, for citizens to feel more included, engaged and valued. This driver is a key component in the relevant core categories of ‘good governance’ – accountability and legitimacy, and within those concepts, transparency, inclusiveness, respect, and effectiveness (Gaventa, 2004; Grindle, 2007; McCall, 2003; McCall & Dunn, 2012).

In Post-Normal Science (PNS) language, this is framed in terms of a call for the ‘democratization of expertise’ and as a reaction against long-term trends of ‘scientization’ of politics, i.e. “the tendency towards assigning to experts a critical role in policy-making whilst marginalizing laypeople” (Carrozza 2015). PNS is not ‘anti-science’, it is concerned with improving the quality of the scientific process to make it more recursive and reflexive. PNS diagnoses and proposes methods to make science and

technology more responsive to policy needs, especially when the acceptance of evidence is contested due to different norms and values, and ‘emotions can be high’. PNS develops more active participation of citizens (regular folk, lay people) and the political value of more local knowledge (Funtowicz & Ravetz, 1993; Gluckman, 2014).

“Agents can change things” (Turnhout, 2016, p.17). This drives the idea that strong feelings and narratives of agency within the public need to be given a platform. Citizens ought to feel more included, engaged, and valued for their delivery of knowledge, and thus they should have more reason to want to be involved in participatory environmental decision-making. The implications for environmental planning and decision support have been the growth of grassroots demands for public engagement (e.g. Col-lectiu Punt 6, 2013; Voinov et al., 2016). The recognition and acceptance of ‘people’s participation’ as a vision also lies at the root of the next two drivers.

## 2.2 Critical (Spatial) Knowledge

This alternative knowledge is usually critical, therefore these participatory processes in decision-making or policy formulation often contribute to conflicts between authoritative (hegemonic) knowledge vis-à-vis the vulgar people’s knowledge or in particular, LSK<sup>3</sup>.

This drives a deliberate impulse towards the privileging of ‘non-authoritative’ sources of information, the knowledge of citizens or the ordinary people, which also appears in the contexts of Citizen Science, citizen journalism or User Generated Content (UGC). In knowledge acquisition, the principles and practices of Citizen Science are exemplary to this approach, through respectful, committed, open, volunteer participation in scientific research. (Cavalier & Kennedy, 2016; Cohn, 2008; Cooper & Lewenstein, 2016; Haklay, 2013). The focus of this article is the context of representing, understanding and communicating community-based *spatial* knowledge, with reference to popular / vernacular / vulgar geographical knowledge.<sup>4</sup>

Participatory cartography is an element critical to the social-political, ideological turn (Bauer, 2009; Corbett et al., 2016; McCall et al., 2015; Radill & Anderson, 2019; Warf & Sui, 2010; Young & Gilmore, 2017). This critical cartography is definitely not ‘authoritative’ knowledge. It frequently serves to disrupt and undermine oppressive social and political systems by contesting and defying the sources and presentations of authoritative spatial information. Those who control the legend on the map (what is shown, with what classification), can control the story (Rambaldi, 2005). Krygier (2008) called this subversive cartography<sup>5</sup>, and Radill and Anderson (2019) assert that ‘disruption’ brings PMapping closer to its (self-proclaimed) goal of supporting progressive change for the historically marginalized. (See also e.g. Casti, 2015; Haklay, 2013; Iconoclastas, 2016; Schuurman, 2009; Warf & Sui, 2010).

## 2.3 People’s Vulgar (Spatial) Knowledge Has Value

A direct consequence of the first two visions is that recognition, value and social significance are being accorded to lay people’s phenomenological and technical knowledge. This principle is also asserted in the methodological approaches of UGC, citizen journalism, Citizen Science and VGI.

In this vision, non-authoritative sources of spatial information and knowledge, that is to say the spatial knowledges of the citizens, the common people, are prioritised and considered to have special value. People’s local spatial knowledge can relate to most elements of their lives and places and livelihoods - landscapes, territories, resources and resource management, risks, security, conflicts, and more. This accords with the notion that LSK is both new and informative, inasmuch as this information is not already held by authoritative (scientific) sources, and also it is alternative, contrary, radical knowledge. In geography terms, this is covered by countermapping, critical cartography, and many different types of wiki mapping such as OpenStreetMap, Google Maps, Maptionnaire, Ushahidi, or Digital Democracy.

In Citizen Science approaches, people do not just provide data as passive ‘human sensors’, but rather they are also active in assessing and commenting on the scientific observations. Of pragmatic

value are the twin realisations by policy-makers that the public can provide their own considerable knowledge, labour, and skills, and, that recommendations are more likely to be acted upon if citizens are included in a spatial planning process. This further adds an economic cost aspect. PMapping is often considered to garner more spatial information for less financial outlay, that is, citizen-providers generate information more cheaply than do expensive consultants.

## 2.4 Greater Technological Capacities

The final contemporary driver is the fast-growing and easy access to technical capacities that enable quicker, easier, user-friendly, and therefore broader, public involvement through the internet and Web 2.0. This is relevant because PGIS is taken here as a technology-oriented sub-set of PMapping. As Graziano (2020) puts it, new Smart technologies give citizens' movements unprecedented possibilities of communication to reach wider audiences, mobilise new activists, and negotiate with institutional actors. There is always a 'digital divide' in PGIS but it is crossed by many bridges, and the primary divides are by age and user-competence, followed by political-institutional restrictions. These are more significant than technology costs, advanced skills, or internet access.

With Web 2.0 there has been rapid development of capacities for affordable, user-friendly, accessible 'WebGIS' on the internet which include conventional GIS systems, ubiquitous GPS, geo-tagging, GoogleEarth mash-ups, dynamic GIS, locative media, and smartphone apps. These WebGIS methods may be, to varying degrees, participatory, critical, diverse and subversive. They can be said to form part of 'GIS/2', a useful term for the broader social and cultural dimensions of conventional GIS methods and instruments that emphasise participatory processes. The conceptual approaches and methodologies in GIS/2 have various labels including Neogeography, Cybercartography, Qualitative GIS, and also critical PGIS. GIS/2 in principle privileges the agency of participants in creating and evaluating information to represent diverse views, disputes and to accept inconsistencies. Thus the concept and practice of GIS/2 should be incorporating the second and third drivers above. (Sieber, 2004; Thatcher et al., 2016). The mapping apps and platforms are complemented by easy-to-handle hardware, including UAVs, smartphones and inter-operative monitoring sensors for water and air quality and human health.

These four visions and drivers are inter-connected and synergistic on the ground. For instance, the development of the tools for PGIS, and GIS/2 in general, responds to political-ideological interests in democratisation and the desire for more and easier popular participation. But they also need to be considered separately, as well as inter-relatedly. For example, concerning the second and third drivers, 'good governance' is usually said to require legitimacy, respect, and inclusiveness which are obviously reinforced by identifying and mapping local (spatial) knowledge to strengthen criticality. On the other hand, the LSK is by no means always anti-authoritative, it may support authoritative knowledge and be harnessed for this, and thus not for reinforcing a goal of critical local knowledge

## 3. FACTS AND VALUES IN LOCAL SPATIAL KNOWLEDGE

### 3.1 Local Spatial Knowledge is Complex, Multi-Sourced, & Multi-Dimensional

The primary intention of PMapping is to capture people's valuable (but often invisible) spatial knowledge, and utilise it better for functional purposes in public policy or environmental management, or in cultural identity and claiming rights. The core object of value and the imperative in PMapping is Local Spatial Knowledge describing home and action spaces, with a focus on knowledge about the land, landscapes, land utilisation and resources. By definition LSK is *local*, derived from long, close relationship between people and a specific land /resource area. LSK reflects the capability and competence of a local community, it is grounded because it represents the knowledge and skills which people in a particular area possess and have built up about the local land (territory, community), knowledge which embodies generations of accumulated practical information. Therefore, LSK is contextually focussed on particular geographical locales. It identifies issues of immediate local

significance, and it encodes the knowledge about the local space in a language locally understood (McCall, 2003; Sieber, 2006; Sletto, 2009; Smith et al., 2017).

However, two significantly different categories or manifestations of LSK need to be recognised: *facts* – the observable phenomena, and, *values*, (preferences and priorities). Beyond or behind them there are ontologies (meta value systems) that may connect the facts and values. See Table 1 below.

### 3.2. “Facts” - Observable Phenomena

In scientific definition, a fact is an objective and verifiable observation about events or actions, magnitudes in time and space, observed with care and in a replicable manner-based on empirical evidence. In conventional spatial analysis, facts are represented as observable spatial phenomena, objects and sites. Facts have a specific geo-referenced location, they have local geographical specificity (localness); they are grounded and idiographic, and they are essential to “situated practice” (Egenhofer & Mark, 1995; Hickey & Mohan, 2004). While all agree that there are ‘facts’, there is slight agreement on how to recognise and differentiate them.

Grounded locally-specific knowledge is similar in characteristics and structure, purpose and cognition, to standard ‘authoritative scientific’ knowledge, except that the facts are known only, or primarily, to local people, whilst being unknown to external professionals or scientists. Therefore LSK is related to so-called “indigenous knowledge” or TEK (Agrawal, 1995; Basso, 1996; Ross et al., 2016; Smith et al., 2017; Tobias, 2010; Warren et al., 1991).

Local spatial knowledge of rural physical phenomena that external scientists/ professionals may not yet know includes material facts about ecosystems, plants, natural medicines, water sources, animal movements, dangers, hazards and risk areas, land uses, pest management, forest products, soil conservation, livestock management, - which facts are all parallel in type to conventional scientific knowledge.

In urban contexts, local people have local spatial knowledge of environmental risks, locations of (in)security, social deprivation, urban ecosystems, quality-of-life, traffic dangers, and so on in configurations which approximate those employed by formal urban experts and planners, but many of these actual local facts are unknown to the experts.

In sum, *most people DO NOT know the Facts*. The reality is that the majority of people do not have knowledge about particular pertinent topics or phenomena in their locale, no more than do the experts. There are swathes of LSK amongst local people, but most of it is highly restricted to specific types of persons. In traditional rural communities for example, elders, shamans (sacred healers), female ethno-pharmacologists, hunters, teachers, priests and imams, midwives, ethno-veterinarians, skilled farmers, youths, will all be repositories of certain kinds of specialised knowledge, which is often highly restricted to this group. Despite a mythology of communal (but secret) ITK and LSK, if the knowledge is extensively known within the local community, then it is usually known also to outside experts.

### 3.3 “Values” – Interests and Priorities

On the other hand, *most people DO feel Values* - even if the values held may be neutral; and they want to express those values. Values are principles, priorities, motives, prejudices. The discourse here deals with specific values that are ascribed to something. There is a distinction between ascriptive values, and meta value systems. Meta values express the idea that ‘values have value’, that is to say, ‘values are worth having’. Value systems - the esteeming and creating of values, - are present in all cultural-political systems, even though the specific values are different between them.<sup>6</sup>

So, besides seeking the *facts* in LSK, PMapping and Citizen Science is employed also to identify and interpret the spatial *values* and priorities of (local) people. PMapping can elicit reliable, interpretable LSK that reflects the varying priorities, interests, needs, opinions, preferences, constraints, sentiments, feelings, desires and prejudices of a gamut of local actors, which is to say, their *values*. These values are commonly different from the dominant or hegemonic ‘official’ view;

moreover contrary to any idea that traditional communities ‘think and speak as one’, these values may not be common within a community, but vary between segments of the population.

In rural contexts, local actors’ values (needs, interests, priorities) concern for instance, balancing conservation and exploitation of natural resources, people’s attitudes towards communal vis-à-vis family/private land management, and views on communal property regimes, intrinsic valuation of sacred lands and landscapes, etc. All these are often misunderstood by external observers. Subtle and balanced PMapping of these differing viewpoints on values is needed, as reflected in a range of ‘countermaps’ (Hodgson & Schroeder, 2002).

In urban areas, ‘values’ would include preferences and priorities regarding the relative importance of greenness, social spaces, or soundscapes (‘are they music or noise?’). Feminist spatial planning has an emphasis on contra-patriarchal valuing of urban space to serve the practical needs and priorities of women, e.g. in terms of safety, childcare, or unpaid domestic labour (Col-lectiu Punt, 6 2013; Colectivo Miradas, 2017; Elwood, 2008; Sweet & Ortiz Escalante, 2017). Nevertheless, different urban groups and individuals may ascribe quite different values to for instance, communal vs. private spaces, congeniality or isolation, or to cultural histories and memories, as seen in contemporary takes on contested historical statues.

### 3.4 “Ontologies” ... Facts and Values Meshed in Belief Systems

Complicating a supposedly simple binary distinction between facts and values, is the recognition of the ontology of particular belief systems. In other words, what are considered to be ‘facts’ may vary, depending on the meta value system. In terms of spatial analysis, (spatial) ontologies intrinsically connect people’s values of and about space with the spatial facts; these things are concatenated. Societies and cultures invest in long, deep processes of creation and appropriation of their meta value system. The designation and interpretation of spatial facts is dependent on, indeed created by, the frame of identification and communication of values. As people’s values alter, they can introduce

Table 1. Secerning Facts and Values in Local Spaces

<i>Geo Facts</i>	<i>Geo Values</i>
<i>Most people DO NOT know Facts.</i> (most people do not have the specialised knowledge of locale)	<i>Most people DO feel Values</i> – about their locale, territory. (the values can be neutral; they are not necessarily intense)
Elicitation of facts requires a low or medium degree of fine-tuned participation, targeted to specific groups	Information on these requires broad, community cross-cutting representation – an extensive take-up of involvement
Preferably much interaction in order to understand the LSK of local facts, events, actions, resources	Preferably deep interaction, in order to interpret the values and priorities, and constraints,
Selection of participants is transparent – respondents are known, and chosen for their specific knowledge base.	Process of selection (sampling) of participants and representation of all interests is difficult to assure. Actors and their inputs should be anonymous and invisible
Creating trust requires confirmation of outsider respect for LSK. Sometimes needs a guarantee that some types of knowledge (e.g. of medicinal species, locations of rare plants) will be kept secret.	Trust is created over time, on both sides; the process is always open to manipulation by both sides, and easily dominated by local elites. Citizens may feel impelled to make their values known, or may feel threatened.
Geo facts can be empowering at the individual level, if recognition is given to local experts. Increases capacity.	Geo values can be empowering on a macro (political) scale if universal. May generate confidence and satisfaction
Likely to be rich and deep knowledge.	Richness and depth will vary, depending on the circumstances and purpose of the exercise.

changes in the interpretation of realised spatial facts, and this feeds back into the ontological system which justifies and re-frames the facts.

A very significant set of local spatial knowledge is the symbolic, emotional, and visionary spatial knowledge of land and landscapes. The 'lay of the land' determines cultural and activity spaces and responsibility spaces. In the case of many indigenous or long-settled peoples, the knowledge of landscape is the embodiment of the people's identity, often intimately related with the care or stewardship of land. These peoples have registered a lengthy, profound process of creation and auto-territorial appropriation. In LSK terms, these are represented in cosmovisions, landscape mythologies, and place-linked creation myths (e.g. Basso, 1996; Colectivo Miradas, 2017; Macfarlane, 2015; O'Connor & Kroefges, 2008; Pearce & Louis, 2008; Wartmann, 2016). These forms of LSK are metaphoric and visionary, thus, "mystical" in modern scientific terms. But, PMapping may (with great sensitivity) represent the place-knowledge and names of secret and sacred sites, holy places, and historical and cultural heritage, within a specific ontological space (Álvarez Larrain & McCall, 2019). Thus there may be only fuzzy boundaries between geo facts of items in space, and the geo values that they hold for people.

#### 4. REPRESENTATION AND REPRESENTATIVITY - CONTESTED CONCEPTS

The translation of facts and values from 'authentic' and often externally-ignored LSK to more appropriately authoritative maps or PMaps, demands both suitable *representation* and valid *representativity*. *Representation* itself is a confusing term, since as Hickey & Mohan (2004, p.19) point out, it has two meanings: firstly, 'speaking for' (such as by a spokesperson, or better said, 'giving a voice') and secondly, 'speaking of', or a translation. In science, the concept of representation is often used to mean a mirror to 'material reality'. Turnhout (2016) argues that this confusion "obscures the politics involved in representation". To mitigate this epistemological contest, this article uses *representativity* to mean "to speak for, or, to speak on behalf of", and *representation* to mean the translation of ideas into words or images or maps. Therefore, in dissecting the PMapping of LSK, it is essential to distinguish between representation and representativity. In natural language, 'truth' is both a question of 'speaking about what', and a question of 'who is speaking'.

In 'representation' - the "speaking about", or "speaking of" - the core question is "*How can the LSK items or manifestations, whether they are facts or values, be authentically represented and translated to outsiders?*". But an authentic representation depends also on the representativity. And in 'representativity' - the "speaking on behalf of" or "speaking for" - the core questions are "*Who can be a representative? – Who does/should speak authentically about anything - any item or manifestation of LSK, whether it is facts or values, in the name of others in the community or group?*"

It might be considered that in PMapping as in LSK, representation is more concerned with facts than with values, and that representativity is more concerned with values than with facts. But under examination this is not simplistically the case. PMaps attempt also to identify and locate and map spaces of value, not only factual information. And on the other hand, the imperative to search for representative voices (representativity) is equally applicable to learning about and mapping facts as it is for values.

##### 4.1 Representation - Speaking of (or, Speaking About)

The issue here is the authenticity and reliability of the items of LSK (both the facts and the values) that are being represented. It refers to the '*truth of the meaning*' of the representations of local spatial knowledge. This is an epistemological issue of the translation from LSK to global scientific knowledge. It is not a question of ontology; rather, the question is: "*Is the 'truth' (whatever it is) being communicated effectively?*" Representations are always necessarily selective, they foreground specific elements of nature and silence others. Turnhout (2016 p.17) asks a rhetorical question - 'how can a scientist represent a meadow?' Representation requires order, a system of classification. As human

constructs, classes and classification systems are primary orders of understanding and explanation in emic 'indigenous' science, as much as in standard 'modern', science.

Rose (2001) critically analysed three aspects of visual representations from feminist iconographics. At the level of 'production', she questions why certain visual techniques (e.g. GIS, maps) are selected for any specific activity; at the level of the 'image', which interpretations of knowledge are included in a particular image and which are not? - are certain groups dis-empowered by the image?; and at the level of the image projection, are the images (maps) understandable by different audiences?

There are many issues concerning appropriate representation. Mapping can 'mis-map' - distort, hide, and lie about the grounded realities of space and place. This is especially true of 2D imagery such as conventional paper maps and GIS images which do not, and cannot effectively represent mental maps. The LSK provided by a community may be in a 'language' that is idiomatic, intuitive, or incorporative (dance, song, body language, e.g. Songlines website), and thus not easily comprehended by outsider professionals or public, and vice versa. In mental maps and LSK, distances can be non-linear and asymmetric; real space is tightly coupled with time; natural language does not use geometric position, but also deictic naïve concepts like near, far, isolated, crowded; three dimensions of space are not universal; ethno-spatial discourse frequently accepts diurnality, seasonality, centrality, and value measures as spatial dimensions (Egenhofer & Mark, 1995)

This raises a question whether mental and participatory maps are more likely than standard maps to be holistic, and issues related to reductionism vis-à-vis holism in phenomenology and ideology. PNS has warned of the dangers of reductionism which carries the idea that every problem can be decomposed into sets of simpler problems. PNS expounds the necessity for holism at the science-policy interface, but in a practical planning context, there is a continual feedback cycle of reductionist and holistic approaches – holism is essential for understanding, and reductionism is needed for doing action.

GIS has been portrayed as a masculinist as well as a reductionist methodology. Feminist geographers have critiqued standard GIS as marginalising subtlety and multi-interpretability, as well as, ambiguity, fluidity, impreciseness, emotionality, spirituality in representation, whereas it reifies Cartesian, positivist, discrete concepts of precision (D'Ignazio & Klein, 2016; Elwood, 2008; Elwood & Leszczynski, 2018; Kwan, 2002, McLafferty, 2002; Pavlovskaya & St Martin, 2007). These geographers conclude that GIS mapping does not recognise non-positivist thinking and therefore is misleading and incomplete.

To what extent are PMapping and PGIS an improvement on standard GIS in terms of representation? PMapping activities, and participatory processes more generally, may be critiqued for being narrowly project-based and not holistic-comprehensive, because they fail to respond to the holistic grand issues of globalisation, inequalities, and neo-liberalism. It is asserted that therefore PMapping obfuscates inequalities by enforcing a (reductionist) focus downwards to (only) the local, that in effect acts as a mechanism for continuing hegemony within the guise of popular participation (Cooke & Kathari, 2001; Radill & Anderson, 2019). There is undoubtedly some truth in this; however, the counter is that PMapping should never be expected to revolutionise power relations on its own; rather, the process should be seen as one that should always raise awareness.

Agrawal (1995) and others, (e.g. Harley, 1988; McLafferty, 2002; Pearce & Louis, 2008; Rundstrom, 1995; Turnbull, 2007; Wood, 2010) have argued the impossibility of authentically representing local or indigenous spatial knowledge. They critique the elicitation of ITK and by extension, of PMapping practices, as the stealing and devaluing (appropriating) of local knowledge, perceptions, beliefs, cosmovisions, cultural processes and imagery, memes, even physical spaces.

Turnbull (2007) challenged that "*If maps are conceived as representations of reality ....., a dilemma is raised by the nature of Indigenous knowledge traditions and multiple ontologies. How can differing knowledge traditions, differing ways of mapping be enabled to work together without subsumption into one common or universal ontology?*" But, the intention is not to subsume indigenous ontologies and LSK into one fixed hegemonic ontology. The PMap product should be created as a bridge or translation from an emic spatial representation (which is peculiarly especial to those people) to an etic



representation that can be understood (partially, or the best possible), by outsiders. There are many absolute necessities for this, starting with the protection of traditional lands or urban neighbourhoods against real external threats that, in order to be countered, need also the support of external forces, whether elements of government or NGOs or woke folks in civil society.

#### 4.2 Representativity – Speaking on Behalf of (or, Spoken By)

Representativity is about democracy and representativeness, and therefore it concerns power and responsibility, and ownership and agency. PMapping intends to be, and may be, *participatory*, but it is not necessarily *democratic* or inclusive ... “participatory processes could well prove less socially inclusive, as well as less transparent, than the alternatives.” (Brown 2004, p.239) (cf. Bauer, 2009; Floredu & Cabiddu, 2012; Haklay, 2013; Kahila-Tani et al., 2019).

PMap proponents may have prior ideological constraints, like an expectation of internal solidarity or homogeneity of communities. But “communities” are not harmonious entities without conflicts. At this juncture consider ‘what is a community?’, ‘how are communities identified?’, and, ‘who has the right to identify them?’ (See e.g. Gaventa, 2004; Hickey & Mohan, 2004). PMapping needs be aware of the internal differences and power relations in community participatory processes (Barlindhaug, 2013;-Brown et al., 2016; Chambers, 1983; Haklay, 2013; Hodgson & Schroeder, 2002; Kahila-Tani et al., 2019).

The PMapping outputs cannot reflect the priorities, opinions, and knowledge consensus of all the community or broader society. The performers in a PMapping exercise are usually not even a small random sample, they are statistically small selected samples and they are filtered by interactive-ness, easy accessibility (and even the dry season), as recognised early on by Chambers (1983). The players (‘participants’) are chosen, either through selection by external agents, or through self-selection by the participants themselves. If external criteria are used for the selection, they are naturally biased by outsiders’ objectives and belief sets, such as selection on the basis of gender, poverty, marginality, landlessness, or previous exclusion. How often are the drunks, vandals, poachers, thugs, loan sharks, muggers, sex workers and illegal loggers included? – but they are equally a part of a community. If it is self-selection, this brings forth the articulate cosmopolitans, activists, the self-confident and charismatic, and the available, or in a more negative perception, the noisy and dominating. “In all communities, different power relations can affect those whose voices are heard; and there will be some who are more eager to share than others, although they may not necessarily be the most knowledgeable” (Barlindhaug, 2013, 52).

In practice it is easy to manipulate the outputs of a “participatory” knowledge generation, e.g. *oujiboarding* in a small PMapping exercise or workshop (cf. Cooke & Kathari, 2001). The end result is that the relatively few participants in a PMapping exercise are in effect ‘special’, supplying just the exceptional knowledges and viewpoints of the select few – hopefully they include the local experts who are the people within the community who know ‘facts’.

Participatory processes are invariably slow, time-consuming exercises for community members, which often compete with vital livelihood activities, such as the peak labour times. The majority of participants donate their time and effort, and their knowledge, without financial compensation. Even volunteers need compensation, but proper reimbursement for involvement are rare in PMapping and ITK research projects. The lack of compensation to participants for the time and LSK they share, is one reason it is difficult for PMapping to be democratic with wide representation; they are inevitably elitist, simply because most people do not have the time to engage.

Understanding and mapping ‘values’ has a different objective from mapping facts, but the contradictions of representativity are similar. ‘Everyone has values’ and therefore in a democratic polity, everyone’s values should be sought, identified, understood, and when it is useful, be mapped. Whether these values will subsequently be held to be fairly weighted and ‘valued’ is another matter.

The majority of PMapping exercises have objectives which are activist and non-neutral; they aim to be equitable, contra-exclusive and interventionist towards transformative ends, they fall in

the spectrum of advocacy interventions. In critical PMapping, a fear of “elite capture” in the social hierarchy is frequently a consideration. But that should not require that the views and values of members of the community who may hold different positions, should be annihilated and ignored by not being included in the PMapping activities.

## **5. STRATEGIES FOR BETTER PMAPPING**

This section deals with ideas for good practice in the PMapping approach that could provide better maps, that is, more valid, more truthful, and more ‘authentic’ representations of facts and values in LSK. And good practice also to ensure more representative, more inclusive, and therefore more “democratic” voices.

### **5.1 Being Reflexive – About Intentionality and Purpose Behind Participation**

Reflexiveness in a PMapping process (Casti, 2015; Colectivo Miradas, 2017; D’Ignazio & Klein, 2016; Elwood, 2008; Kwan, 2002; Sletto, 2009) means more than interrogating the reasons and expectations of the community actors who involve themselves. Importantly, also the rationale and intentions of powerful outsider stakeholders for permitting, promoting, enabling or encouraging community people to participate, or that might prevent them from participating. These ‘outsiders’ include the PMapping teams themselves. Thus there is double question: ‘Why do individuals/communities participate?’, and ‘Why is participation being pushed?’ (McCall, 2003; McCall & Dunn, 2012).

In any PMapping process, the choice of whether to focus on facts or values always depends on the purpose of the mapping, and the ‘owner’ of that purpose. There are many competing justifications for PMapping; the deep ‘purpose’ can usually be discovered in terms of a range of competing intentions behind participation activities. PMapping may be to facilitate external objectives by providing window-dressing or lubrication for outsider interests; or it may be aimed towards promoting autonomous empowerment; or it may try to target something in-between, an improved collaboration between insiders and outsiders (Corbett et al., 2016; Floreddu & Cabiddu, 2012; Kahila-Tani et al., 2019; Sieber, 2006). Analytical and operational clarity about the purpose is key. Before embarking on the process, the objectives of the PMapping exercise and what the different parties may expect from it, need open transparent discussion (McCall & Dunn, 2012; Rambaldi et al., 2006)

All participatory processes ultimately have problems of who participates, this extends to who decided who could participate, and how this decision was reached, and so on, indefinitely. This issue is foundational, it cannot be side-stepped and it cries out for reflexivity, (though it is not peculiar to participatory mapping).

Consider the complex ethical, and methodological implications of the positionalities of the members of PMapping teams, like their race, class, and gender (D’Ignazio & Klein, 2016; Elwood & Leszczynski, 2018; Kwan, 2002, Pavlovskaya & St Martin, 2007). PMapping practitioners are not independent of their context, they are grounded in their milieu, not flying above the clouds. There is need to interrogate the personal lenses and experiences in the field of practitioners, and critically explore how data collection and knowledge production are socially situated, examine how participatory research resonates in local communities, and the impacts on PMapping workshop participants who are the producers of knowledge.

### **5.2 Reduce Parochialism and Expand Representativity**

If parochialism - that is the limited social and geographical coverage of the participation in the mappings, can be reduced, the significance of the outputs should be improved. Who is going to be the owner of the map outputs? Who determines the fundamental purpose of the mapping exercise and decides on priorities amongst interests? Who selects the information to be included, the sources of information, and the “key informants”? Who decides on the legend - what items will be marked on the map? Who works on the mapping processes and on cross-checking? Who represents the

community in subsequent presentations and updatings of the spatial information? (Kahila-Tani et al., 2019; Rambaldi, 2005; Rambaldi et al., 2006).

Alternative designs and procedures are required that allow extending the socio-spatial coverage beyond the parochial and beyond individual cases. To make PMapping more representative of the people in the community and thus more 'democratic', a broader range of participants is needed. More open access with more accessible information for comparisons and cross-learning, as with e.g. Green Maps and OSM (Open Street Maps), and Wiki principles of continuous validation. A potential methodology is Delphi processes for cross-checking a range of PMaps and exchanging feedback between different groups.

To investigate the significance of representativity, evidence-based comparisons can be made between PMapping sessions working with homogeneous and/or heterogeneous groups, and PMaps created separately by individual people but then aggregated into a combined map. The differences between the two approaches can then be analysed. It may be expected that the results will be different because people will behave, and therefore map differently, if they are doing it individually or in a group. There is peer approval and pressure to consider, so maybe this effect would be stronger with groups of young people.

Until now, there has been little investigation of the reliability of PMapping in terms of consistency of the representations – whether over time, or comparisons for individual maps vis-à-vis group maps. But see exceptions in the work of Greg Brown (e.g. Brown et al., 2016; Zilkafli et al., 2017) or Raymond et al. (2009) who mapped community values comparing both individual and group PGIS formats.

### **5.3 Reducing Ephemeralism in PMapping**

There is a reason to increase the time scale of PMaps of LSK beyond the immediate, and this is to reduce ephemeralism - the short-term nature of findings from PMapping. This issue is less about "how" to represent, and more about "what and when" to present local knowledge.

Ephemeralism is a conceptual issue when it comes to seeking out and interpreting true representations, both for facts and values. The map 'objects', the facts and values, change dynamically over time, the changes may be abrupt or halting, they may be predictable or unexpected, and respond to feedback. The selected knowledge events are mapped at particular points in time and therefore they are not representative over a longer time period, they are ephemeral. But there are no easy rules for how frequently the events or values should be rechecked, nor for what are the triggers to call time for a new mapping.

There is the further problem of who is providing the local knowledge. Representativity is also ephemeral, in that the sources of local knowledge change over time, they are not enduring. Moreover, participation is supposed to be an ongoing open-ended long process, therefore in principle the end-states of participatory approaches should not be pre-set. However in reality very many PMapping activities are externally-funded short-term projects, such as NGO training actions or graduate research. A strong participatory approach needs continuous activity, but because long-term institutional commitments are rare, there are rarely long-term budgets to continue with the exercises.

## **6. CONCLUSION: SETTING PMAPPING ON COURSE**

Ethics and good practice in participatory mapping and PGIS need to recognise and deal with a contemporary framing of mapping of local spatial knowledge. This paper has aimed at discerning or discriminating between two pairs of essential concepts: (i) the 'facts' and the 'values' discernable in the knowledge being mapped; and (ii), the 'representation' and the 'representativity' that shape participatory mapping processes. To maintain the criticality of PMapping, firstly, resist the slippage into fake news which can easily follow from eliding facts and values; secondly, explore why and how to trust outside of the natural bubbles of our comfort zones; and thirdly, acknowledge that participatory

mapping (and similar participatory learning) is not democratically representative; rather, it celebrates the exceptional inputs of exceptional people.

Re. resisting fake news, the threat is that PMapping and other participatory activities fail to distinguish between facts and values; or, they are being re-purposed not to distinguish between them. A parallel can be seen in the contemporary 'fake news' post-truth paradigm. *Fake news* used to mean simply false news, but in the 2020s the concept has come to mean distortion and denial of fact and evidence-based truth and rational scientific argument. Fake news negates trust in evidential concrete facts and instead promotes untested and unchallenged beliefs based on emotionalism, to distract and obfuscate from unwanted news and dissonant values.

The memes are increasingly disseminated especially in social media. In politics and ideology fake news is used to subvert for political gains as a deliberate strategy to facilitate and legitimise the entry of uncritical forms of populism: consider the Tonkin Gulf Incident, WMDs in Iraq, the lies of the Brexit campaign, migrants painted as criminals in the USA, rewriting the history of the Taj Mahal or of the Rohinjas, the pizzagate child ring and QAnon conspiracies. Likewise, it is plentiful in popular culture: consider the death of Lady Diana, the Disney/Stanley Kubrick moon landing, la niña Frida, April Lavigne, or Hello Kitty. Politically-driven fake news also specifically targets scientific discourse and scientists. The webosphere is bombarded with the many lies against the science of climate change, (Allen & McAleer, 2018; Hess, 2014) and 'anti-vaxxers', or less profound, the Flat Earthers and the myths of Gwyneth Paltrow and her Goop health elixirs (for meta-views, see e.g. Goreis & Voracek, 2019; Vosoughi et al., 2018).

Such fake news memes are easy for social scientists to critique, or simply to deride and dismiss. However practitioners in participatory research and in PMapping can too often turn a blind eye to unrepresentative informants, ephemeral and limited information inputs, selected knowledge that fits pre-set frames, and the unacknowledged emotions orienting our methodologies. This is a real danger in an uncritical take-up of Neogeography, Qualitative GIS, and critical cartography. There is currently a pervasive paradigm in PMapping that tends to normalize the obfuscation of the difference between facts and values. If there are not persistent and self-reflexive efforts to distinguish as clearly as possible between the categories of facts and values in the spatial knowledge acquired, then PMapping products can easily fall into a swamp of fake news (Harvey, 2018; Voinov et al., 2016). The significance of this is difficult to over-emphasise given knowledge as performative – that is to say, our representations of reality are what reality comes to be, so that "producing knowledge constitutes world-making" (Turnhout, 2016). It has been argued, for instance, that "... Neogeography democratized GIS practices, broadened the ontological scope of GIS", and that "Neogeography poses epistemological challenges to a dominant theory of truth, advancing away from correspondence model of truth, toward consensus and performative interpretations" Warf & Sui (2010); (c.f. Radill & Anderson, 2019). Although this may be a partially correct assessment of the impacts of Neogeography (therefore including PMapping) it is nevertheless dysfunctional and dangerous, if it opens the Pandora's Box of fake news (cf. Haklay, 2013; Harvey, 2018). The methodological approach for knowledge creation to evade this, is empirical observation and elicitation of information, evidence-based, careful critical logical reasoning towards assessments, and sensitive nuanced judgements.

The argument here is seen as sensitive, because it can too easily be wrongly interpreted or distorted as an attack on recognising and valorising the values of many subjugated and marginalised peoples and their ontologies. Such attacks have always been employed to reinforce hegemonic controls over individuals and groups; and Neogeography and PMapping after all were built specifically to counter that and give 'voice to people'. But the criticism is misjudged and misapplied because the crux of the argument here is that the critiques of the socio-political system context should be extended to critical thinking together with a self-reflexive criticism of PMapping's methodology. Critical thinking is closely related to transparent, self-reflective thought (as in feminist geography) about own beliefs and actions and how they are related to the locus of the people, the history and place.<sup>7</sup> This is no attack on identity, sensitivity, feeling, or ignoring appropriation. For PMapping to function as it claims to,

it is imperative to adhere to the fundamentals of scientific scepticism, perpetual questioning, and the use of reason. *'Sentio ergo Sum'* should complement, not replace, *'Cogito ergo Sum'*.

Re. 'trust and bubbles', is trust based on observational, repetitive (science-based) evidence? or, on shared values, emotion and identity? Creating and maintaining trust is a slow investment because it requires the accumulated experiences of interactions with, and the cognitive and behavioural as well as emotional absorption of, the 'other' (Dietz, 2011; French & Monahan, 2020; Hillebrand, 2020). Participation and PMapping must therefore be slow by procedural design. Furthermore, trust is best constructed when there is mutually-recognised purpose. At a profound level trust needs shared meanings of truth, but we do not live in a world of shared truths, we live in mini-worlds of informational filters and in "bubbles", so we do not encourage opposition to our views. We rely on confirmations of our views from mutually-reassuring, like-minded, uncritical 'mirrors, and this easily leads to disinformation and scepticism of scientists. French and Monahan (2020, 6-7) characterise the contemporary exchange of information as "a form of populist postmodernism where trust in institutions is eroded, leaving no agreed upon mechanisms for adjudicating truth claims". (C.f. Hillebrand, 2020; McCall et al., 2020). Furthermore, the framework of trust in shared communities is fast shifting structurally with the explosion of social media. The commonality of 'communities' is no longer spatially constrained to geographic neighbourhoods or the immediate family. What and where is 'community' in the age of Facebook and TikTok and Instagram?

In PMapping activities, strong trust comes from strong interaction between facilitators and community, even if only for the short term of the project exercise. Trust and lack of trust is two-way. Citizens often do not trust the appropriation and use of their LSK and their stories. People may be afraid, frequently with good cause and through hard experience, that what they voluntarily provide in PMapping workshops will be misused by the authorities against them, their neighbourhood, or their local society. For instance, such was the response to a VGI initiative on urban safety in a city in Mexico; and at the same time the authorities did not trust the information inputs of the citizens (Guiza & Stuart, 2018). Whereas in Nairobi, *Map Kibera* (Website) created trust bubbles by employing 'bounded' crowdsourcing – uploaded reports were acceptable from known trusted individuals in the community.

Re. 'democracy and exceptionalism', PMapping foregrounds the informed exceptionalism of specific local people and their LSK, and how this is a correction to external (scientific) knowledge. PMapping therefore cannot claim to be inclusive, and, democratic. This is ironic in so far as so many PMap programmes do make claims of 'inclusivity' whilst alluding to their interventionist efforts to deliberately involve under-represented peoples whom they identify in a community. These are justified activist interventions to balance or compensate for years, if not centuries, of exclusion and marginalization - of women, of age groups, castes, ethnicities, economic classes, religions, the 'other'. But they should not ignore that these exercises represent the views of only some citizens and there will always be alternative opinions. Participatory mapping is thus often undemocratic in the sense that it does not represent even the average of the community, much less a community consensus. It is not inclusive of everyone, - consider how the actors become involved (or not) in the processes of PMapping, whether they are self-selected participants, or identified from outside.

The argument here is that this label of "undemocratic" should be celebrated as a strength of PMapping and not a weakness, so long as it is acknowledged. PMapping should value and celebrate the extra-ordinaryness and exceptionalism of the LSK which is informed by local people and local experts. This is especially valid for the LSK of facts that are known by the *local experts*, the men and women in the community who have special knowledge which can complement or correct the 'global' scientific knowledge of *external experts*. PMapping processes should emphasise the selecting of local experts (be they the elderly, local technicians, traditional leaders, women farmers, shamans, ethno-veterinarians, artisans, hunters, traders, local teachers and religious leaders, children, whatever) to be a critical task, systematic and criterion-led, because they are knowledgeable, not because they represent anyone. Homogeneous equality of knowledge between community members should not be expected.

As for the LSK of values, although this article argues that ‘*all* or most people do feel values’, there is another significant exceptionalism emergent in such participatory processes. This is the exceptional, committed and progressive social activists who explore, critically develop, and present the LSK of the values of themselves and their community.

To conclude: a Vade Mecum for PMapping would be to ‘*Keep the company of those who search for truth; run from those who have found it*’, a pertinent aphorism attributed to Vaclav Havel<sup>8</sup>. The PMapping of local spatial knowledge is invaluable for communities, and to avoid its products being subverted into fake news, PMappers need the continuous scepticism of an authentic scientific approach. Therefore, recognise, appreciate, and value local spatial knowledge – the appropriation of LSK is theft. Practice self-reflexivity in all PMapping processes because critical thinking is a requisite for critical cartography, even if this implies straying outside the comfort bubble. In the representation of LSK, distinguish between facts and values, and resist generating and delivering fake news based *only* on emotion. In questions of representativity, broaden out from a parochialism and ephemeralism of the voices of LSK. Finally, do not rely on a façade of an appeal to democracy, but celebrate the exceptionalism of the contributions to Pmapping.

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## ENDNOTES

- 1 The terms “participatory mapping” and “participatory GIS (PGIS)” are overlapping and complementary, associated with approaches like Neogeography, GIS/2, critical cartography, Qualitative GIS, etc. This article uses *participatory mapping (PMapping)* as also incorporating PGIS.
- 2 The focus here is participatory mapping and PGIS at community level, not participation processes nor Citizen Science nor PNS in general.
- 3 There are other relevant names such as TEK (traditional ecological knowledge) and ITK (indigenous technical knowledge) which are fairly interchangeable. Here the focus is on local/indigenous *spatial* knowledge.
- 4 In addition to PMapping and PGIS, the term also incorporates Volunteered Geographic Information (VGI), especially if VGI is taken as Vulgar Grounded Intelligence (VGI.2) (McCall et al., 2015).
- 5 Krygier (2008) painted maps as alluring and evocative, yet they can be contra-normal, detached, even alien, in that they “.. impair social interaction and are emotionally detached with, paradoxically, the potential for unusual creativity, talents, and high intelligence.”
- 6 Nietzsche in *Thus Spoke Zarathustra* foregrounded, not the specific content of people’s beliefs, but the need to value per se. “A thousand goals have there been so far,” says Zarathustra, “for there are a thousand peoples”.
- 7 Cf. Harvey’s (2018) appeal to critical thought vis-à-vis critical thinking, built on Glaser (1972).
- 8 Havel was following André Gide who wrote “Croyez ceux qui cherchent la vérité, doutez de ceux qui la trouvent”.

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