

Towards a post-colonial GIS

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1. Introduction

Participatory Geographical Information systems (PGIS) are being used with Indigenous communities worldwide who are engaging with mapping technologies developed essentially in the developed world. However Indigenous people have their own understanding and cultures that include ways of knowing and understanding the world around them. This paper is an initial attempt to review different ways of spatial thinking and to make preliminary suggestions as to how modern visualization methods may be used to portray these representations.

2. Indigenous mapping and Participatory GIS

Indigenous and traditional people have an innate understanding of the environment in which they live and move but with limited resources to protect their use of these lands. Governments, conservation organisations, other NGOs and companies involved in the extraction of natural resource often have recourse to sophisticated Geographical Information Systems and other technological tools with which they manage and govern these same lands. These GIS tools are influential in negotiations and are used to demarcate boundaries. Participatory mapping is increasingly being used with Indigenous peoples to enable the political empowerment of local people, to establish land use claims and rights; and for environmental protection (Chaplin & Threlkeld, 2001; Laituri, 2002). However communication between Indigenous and others is often unbalanced in favour of those with the more sophisticated technologies and the recognised ways of analysing and visualising knowledge.

There is a growing field of research into developing integrated approaches to participatory development (Rambaldi et al, 2006¹). A variety of methodologies are used within Participatory GIS (PGIS) stemming from a fusion of Participatory Learning in Action (PLA) with Geographical Information Technologies and Systems. PGIS is being used as a powerful tool to give Indigenous and traditional people a voice and has been identified as a positive means for the recognition of cultural heritage. At a basic level local people are encouraged to produce ground maps (sketches in the dirt) that maybe transferred at to computer-based systems. Rambaldi et al, 2006², are instrumental in introducing 3D participatory mapping, or physical construction of 3D models, that enabled people to visualise their environment more effectively. In other areas sophisticated multimedia GIS have been established to incorporate digital video, photographs audio and text that documents indigenous knowledge (Corbett and Keller, 2006). Where possible, representatives from the local people are trained in the use of GIS so that they have control over and maintain ownership of their knowledge.

3. Indigenous Spatial Thinking

Research within the PGIS arena is trying to integrate people's knowledge with western mapping. However, although Western-led PGIS practices have been

demonstrated as being extremely beneficial, the spatial representations used are normally from the Euro-American perspective, in which there is a heritage of mapping techniques and methodologies based on colonial ideologies of land ownership.

The evidence for different types of spatial knowledge can be identified in literature from a variety of sources. Writings on biocultural diversity (citations in Cocks, 2006) identify places of cultural identity that contribute to a people's sense of place. From anthropology, examples can be identified of alternative Indigenous or cultural ways of spatial knowing such as aboriginal dreamtimes and shamanic visions of place and movement. McCall¹, 2007, classifies indigenous spatial knowledge into three categories: Indigenous / local (spatial) technical knowledge, 'counter maps', or different viewpoints of local spatial knowledge, and sacred spatial knowledge or 'cosmovisions'.

Indigenous peoples often have a more fluid way of demarcating and sharing land and understanding space. Fox, 2002, describes the changes in spatial thinking made by Thai people when they had to construct boundaries to the Kingdom of Siam from fluid ideas of communal and shared land. Contrary to striving for greater precision in mapping, Indigenous maps may be more appropriate if they allow imprecision to characterise the mapping and to reflect vagueness.

It is still believed that the spatial paradigms used by indigenous groups are not fully understood or being incorporated into what are essentially Euro-American centric ways of thinking (Johnson et al, 2006). Renee Sieber, 2000, called for a change in the social construction of GIS by stating "changing the intrinsic nature of GIS and impact the individuals who make decisions about the design, development, and modelling of the technology."

Golledge (1981:21) alerts us to "the risk of becoming dogmatic by trying to force all worlds into one very limited format, and in doing so we ignore, belittle, or forget the others." It can be argued that methodologies and visualisations as used in GIS rarely include alternative, more individual, ways of thinking spatially. They are grounded primarily on the developed world's cultural heritage of spatial literacy. As there are many languages and ways of knowing the world should there not be other ways of analysing or at least visualizing reality?

4. Towards a Post-colonial GIS

There are already a few attempts to extend the repertoire of analysis and visualisation techniques to incorporate other ways of spatial knowing. Turnbull, 1998, calls for outside (Western) mapmakers to 'strive toward a post-colonial, post-modern cartography'. Johnson et al, 2006, use the example of a different epistemology embedded in Hawaiian culture that is represented through dance performance. Bodily directions represent and communicate information about space. However Western map makers have difficulty recognising these cartographic literacies based on song, performance or story telling. They are down-graded and subsumed by the colonial cartographies that are embedded in GIS and which, without care, may be propagated through the PGIS mechanism. "The vast majority of PGIS systems cannot authentically reflect and represent the 'mental maps' of people that are situated in

non-Cartesian, non-positivist, ambiguous, fuzzy, and non-discrete spatial ontologies.” (McCall², 2007)

Within this current thread of research and development to incorporate other ways of seeing, there are avenues that may be pursued to link cultural methods of portraying spatial knowledge with modern technology. Ways need to be developed to bridge the gap, to empower people in their own spatial languages and to help to educate GI scientists and other users to adopt new ways of thinking so as to see with other mind sets. Users of technologies already have to make mental leaps to fully ‘read’ maps, so it should be possible to learn new mapping systems. Further, technologies such as multimedia and virtual reality systems are now becoming more sophisticated but instead of the constant strive to recreate reality in objective forms, it is also possible to recreate other realities and other ways of seeing (Moore, 1999). Perhaps a new step is for GI scientists to allow themselves a more subjective engagement with space instead of the harsh objectivity of much geographical analysis. For instance, theoretical constructs from phenomenological discourses that concentrate on understanding the world rather than trying to explain it may be applied to understand firstly ones own and then other forms of spatial knowledge. A re-evaluation of cognitive mapping and its inclusion within geographical information science (Mark et al, 1999) within new visualisation and computational methodologies may prove productive. Indeed, the question asked by Mark et al (1999:764), “What would a place-based, rather than coordinate-based GIS look like?” may be a starting point for theorising on an alternative GIS.

Several developmental threads within visualization can be imagined to support cultural concepts of space and place. The first uses more abstract modelling within virtual reality environments to understand what is important to other cultural mappings. The second would recreate some of the performances that represent spatial concepts, through multimedia or through abstract modelling. The final suggestion is the use of virtual reality systems with participatory GI activities (Lammeren & Hoogerwerf, 2003) to provide cross-cultural exchange of cognition and spatial understanding.

This paper will critically review the constructions of indigenous knowledge through Western cartography and the participatory mapping process. It will attempt to suggest means as to how the methodologies may be improved through acknowledgement and incorporation of other knowledge systems. It will review and discuss other forms of spatial knowing and visualization. The author sets out to ask questions of the audience about how they can engage with spatial knowledge in perhaps less objective but still meaningful ways. Finally it will try to identify the way forward to train Western mapmakers in other ways of spatial thinking and by using appropriate technology and methodology to start to develop a post-colonial GIS.

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