Theory, Practice, and History in Critical GIS: Reports on an AAG Panel Session

Abstract

Extending a special session held at the 2008 annual meeting of the Association of American Geographers in Boston, this commentary collection highlights elements of the critical GIS research agenda that are particularly pressing. Responding to a *Progress* report on critical GIS written by David O'Sullivan in 2006, these six commentaries discuss how different interpretations of 'critical' are traced through critical GIS research. Participants in the panel session discussed the need for a continued discussion of a code of ethics in GIS use in the context of ongoing efforts to alter or remake the software and its associated practices, of neo-geographies and volunteered geographies. There were continued calls for hope and practical ways to actualize this hope, and a recognition that critical GIS needs to remain relevant to the technology. This 'relevance' can be variously defined, and in doing so, researchers should consider their positioning *vis-à-vis* the technology. Throughout the commentaries collected here, a question remains as to what kind of work disciplinary sub-fields such as critical GIS and GIScience perform. This is a question about language, specifically the distance that language can create among practitioners and theoreticians, both in the case of critical GIS and more broadly throughout GIScience.

Keywords: critical GIS, PPGIS, GIScience, GIS, human geography

Résumé

Pour faire suite à une séance spéciale qui s'est tenue à Boston, en 2008, dans le cadre de la réunion annuelle de l'*Association of American Geographers*, notre collection de commentaires met en évidence les éléments du programme de recherche sur les principaux points du courant critique dirigé à l'encontre des SIG. En réponse à un rapport provisoire sur ce courant critique, rédigé par David O'Sullivan en 2006, les six commentaires expliquent comment on a retrouvé différentes interprétations de ce courant critique dans les documents de recherche. Les participants aux réunions d'experts ont signalé qu'il fallait poursuivre les discussions dans le but de proposer un code d'éthique sur l'emploi des SIG, dans le cadre des efforts déployés visant à modifier ou à adapter le logiciel et les pratiques associées, dans le domaine de la néo-géographie et de la géographie volontaire. On a lancé de nombreux appels d'espoir, on a proposé des moyens pratiques de satisfaire les attentes et on a reconnu que le courant critique doit garder une pertinence sur le plan technologique. Comme cette « pertinence » peut se définir de différentes façons, les chercheurs doivent envisager leur position sur le plan de la technologie. Parmi les commentaires recueillis, il reste à déterminer quelle sorte de travail on effectue dans les sous-domaines disciplinaires comme le courant critique sur le SIG et la science de l'information géographique. Cette question touche le langage, plus particulièrement la distance que le langage peut créer entre les spécialistes et les théoriciens, à la fois dans le cas du courant critique et, plus généralement, dans celui de la science de l'information géographique.

Mots clés : courant critique sur les SIG, SIG participatifs, science de l'information géographique, SIG, géographie humaine

critique we need some conception of well-being and ill-being'' (2008). This places ''critical'' social science in an awkward relationship with ''objective'' science, but it is surely correct, if being ''critical'' is not to become merely a synonym for being sceptical. This perspective has implications for those professing a ''critical'' position on GIS. CGIS is not only about analysing GIS technology and its effects in the world; it is also about changing the technologies and their effects for the better, in some sense beyond the technical. I have space only to briefly consider what this perspective means for the role of CGIS in geographical information science (GISci) and human geography (HG), in GIS education, and in the development of a professional ethics for GIS.

In spite of the success of CGIS as an academic niche somewhere at the intersection of HG and GISci, it would be a brave observer who claimed that CGIS has had much impact on either. CGIS may even let both larger enterprises off the hook. The labelling of GISci as ''science'' may be partly to blame, but CGIS bears some responsibility also. To label certain work ''critical'' is to imply that other work is ''uncritical,'' a dichotomy not conducive to productive exchanges. Yet all is not lost; the focus of much contemporary GISci on foundational issues such as ontology and semantics is surely fertile ground for renewed and enhanced engagement between CGIS and GISci. The relationship of CGIS with HG is more tenuous. Various ''digital geographies'' remain oddly divorced from CGIS (see, e.g., Graham 2003). Meanwhile, within CGIS there have been repeated calls for more work on the political economy of GIS (O'Sullivan 2006; Sheppard 2005; Chrisman 2005), but progress has been limited. There is also a paucity of work on the effects of GIS on society, particularly on social policy, where constructs such as ''spatial concentrations of poverty'' depend on GIS for their very existence. In short, there has been little work on how the adoption of GIS by corporations and governments concretely affects their actions.

These concerns bring me, finally, to two aspects of how CGIS might be expected to make a difference beyond the academy. Both relate to our role as educators. First, how can the insights of CGIS research be conveyed in the classroom? GIS courses are often perceived by both students and teachers as being primarily about developing marketable skills rather than critical insights, an attitude that may become more firmly embedded over time as GIS continues its advances in the workplace. In this setting there may be limited patience for nuanced understandings of the implications of GIS for society. The risk is that CGIS becomes just another week of lectures in an already crowded syllabus – just another perspective, when in fact its insights should inform the whole curriculum. At least one textbook points to an alternative approach (Schuurman 2004), and the commendably visible placement of ''GIS&T and Society'' in the UCGIS's ''body of knowledge'' (DiBiase and others 2007) is another encouraging sign. However, it is clear that sustained engagement with curriculum development in our own and other disciplines, and also with broader agenda-setting exercises, is necessary if CGIS is to really make a difference.

A second and closely related point is highlighted by the appearance in the ''body of knowledge'' of ''Ethical Aspects'' (DiBiase and others 2007). GIS is currently evolving into a profession, and university educators are central to that evolution. It is easy, from a ''critical'' perspective, to be dismissive of professional codes of ethics as merely instrumental – necessary garb for admission to the privileges of the professional world. However, that position is a dangerous and negligent one. Again, I return to the argument that the most progress has been made in CGIS by those who have engaged fully with the technology and its associated practices. With that lesson in mind, the development of educational curricula and professional codes of ethics is a task whose urgency equals or exceeds that of the development of inward-looking academic research agendas and ever more sophisticated critiques.

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Critical GIS and Its Positionality

Marianna Pavlovskaya

While there are different narratives and definitions of critical GIS, ''critical'' clearly implies questioning the status quo, whether dominant practices of knowledge production or dominant configurations of social power. It also implies going beyond critique by thinking about possibilities, creating new social imaginations, and producing hope in and desire for those imaginations. Critical GIS, then, is a field that conceives of how geospatial technologies can be used to counter scientific and social conservatism. It involves three often interrelated and overlapping strands of research.

The first of these strands is the critique of dominant practices of knowledge production aligned with GIS and other geospatial technologies, which includes an inquiry into the social history of GIS as well as thinking about its future (Pickles 1995; Kwan 2002; Sheppard 2005; St. Martin and Wing 2007). The second strand involves going beyond critique and using GIS and geospatial technologies in progressive social research that is often informed by critical human geography perspectives such

as social or environmental justice; gender, class, and race analysis; counter-mapping; and participatory action methodologies (Craig, Harris, and Weiner 2002; Elwood 2006a; Pavlovskaya 2002; Pavlovskaya and St. Martin 2007; Knigge and Cope 2006). It is this work that is turning GIS toward understanding and changing dominant configurations of social power and away from the corporate world, military interests, and applications designed to enhance surveillance and control. This work also makes GIS a practice invested with hope. Finally, critical GIS implies an approach to research that brings a post-positivist sensibility into the technical development of GIS itself (O'Sullivan 2004; Ahlqvist and others 2005). This work transforms the "box" itself, and, by doing so, it opens GIS to further interventions and uses within the many epistemological frameworks of human geography (e.g., ontology, semantics, interoperability, uncertainty, complexity theory, fuzzy logic, dynamic modelling, multimedia GIS, and visualization research). A GIS scholar working on problems of uncertainly told me 10 years ago that he was doing "postmodern GIS." It did not make much sense to me then, but it certainly does now.

Today, critical GIS is a unique combination of technology, knowledge, and social commitments. But until recently, few would have imagined critical geographers using GIS, or GIS scholars contributing to the post-structuralist rethinking of science and technology. Indeed, GIS and non-positivist discourses were long thought to be incompatible at all levels – ontological, epistemological, and methodological (see Table 1).

What developments have enabled these alternative understandings and deployments of GIS in the last decade? Academically, geography is now a theoretically plural discipline in which the partiality of knowledge has become an acceptable epistemological stance. In addition, there is an ongoing de-linking of epistemological positions from particular methodological approaches across the social sciences. In the past, "positivist" scientists argued that only quantitative methods (as a basis for measurement) were valid, while critical geographers argued that only qualitative reasoning and research methods could produce meaningful results. Yet today both quantitative and qualitative methods are practised across a variety of epistemological frameworks. This makes GIS, despite its initial association with quantitative and positivist traditions, of interest to researchers working within many different paradigms. Furthermore, and contrary to prevailing assumptions, mainstream GIS has relatively limited quantitative capabilities and is surprisingly compatible with non-quantitative analytical techniques, including ethnographies and other qualitative analytical methods common in critical geography (Pavlovskaya 2006).

The visual impact of GIS is arguably its most powerful non-quantitative functionality. While paper maps share this ability to persuade, the rhetorical power of GIS is significantly augmented by its association with science, technological progress, and an unprecedented problem-solving capacity. The recent advances in geovisualization, too, expand the opportunities for GIS-based qualitative reasoning. Perhaps most compelling to critical researchers is the ability of GIS to reveal and/or constitute alternative worlds by making them visible on the computer screen. GIS does not simply "visualize" data; it has an ontological power. It persuasively constitutes alternative ontological understandings of the world (not in a GIS sense, in this case, but in a social theoretical sense; see Schuurman 2006).

Despite this new-found affinity between critical geography and GIS, critical GIS scholars are still in an ambiguous position with respect to these two bodies of knowledge. Nadine Schuurman (2000) has described the 1990s incompatibility between discourses of GIScientists as the insiders and those of critical geographers writing about GIS as the outsiders. Since then, we have successfully forged a community of critical GIS scholars who both write about and use GIS technology (Schuurman and Pratt 2002). But another problem of position that concerns this rapidly growing community remains.

While we, as critical GIS scholars, think we are in both camps, others may see us in neither. That is, GIS practitioners see us as "outsiders," part of the critical human geography camp that they believe dismisses GIS altogether, while social theorists and critical human geographers position us as essentially within the GIS

Table 1. Incompatibility of "traditional" GIS and non-positivist discourses

	"Traditional" GIS	Non-positivist Discourses
Ontology	Objective world directly observed	Critical realist (social structures and mechanisms are not directly observed) Post-structuralist (reality is not meaningful outside discourse)
Epistemology	Knowledge is value-free Researcher is objective Data, facts, spatial patterns and distributions Generalization, hypothesis testing Scientific method	Knowledge is value-laden and partial Researcher is situated, reflexivity Voice of the subject Understanding social mechanisms and eliciting experiences Explanation of causal mechanisms
Methodology	Quantitative, data driven	Qualitative

camp – we may examine women's lives, for example, but we do so using the same ''spatial science,'' albeit via a more powerful technological device. While our work strives to bridge the epistemological divide, the two communities that it bridges, or at least their most established cores, remain divided and fail to see the possibility of moving beyond their division.

I find this situation especially problematic for graduate students and beginning assistant professors, who are increasingly interested in doing both GIS and social theory but find themselves subject to the epistemological differences of their faculty advisors or of the departments where they seek employment. Clearly, we still need to work toward a position for critical GIS and its practitioners that benefits fully from both social theoretical and geo-technological realms. This is especially important given how fruitful their juxtaposition has been and will be further on. Obviously, GIS can never replace the critical explanatory narrative (and there is no need for that), but it may enable new narratives, and in new ways. In fact, GIS is increasingly integrated into non-positivist research, not only as a visualization device but as a part of interactive and iterative research and multimedia methodologies (e.g., Knigge and Cope 2006). In this capacity, GIS helps to construct narratives similar to those of paper maps, but now in even more powerful and engaging ways.

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Is the Rubric ''Critical GIScience'' Effective? An Argument for Theoretical GIScience

Nadine Schuurman

I wish to issue an iconoclastic challenge to the term ''critical GIS'' and to those of us who fit under its rubric. The term implies (a) that there is something to be critical of (there is), and (b) that our raggedy band of critical GISers is somehow separate from the mainstream of GIS (which is also true). So far my argument is demonstrably weak, as everything the term implies appears to be true! But the question it raises is whether we wish to linger at the fringes of GIScience, cultivating epistemological critique, or whether we might be more effective – if less visible – as a more integrated cadre.

Perhaps an effective beginning to this train of thought would be to ask what critical GIS is – or, at least, what it is that critical GIS scholars do. A cursory examination of critical GIS papers from the past decade has helped to refine my understanding (Crampton 2003a; Elwood 2006b; Harvey and others 2005; Pavlovskaya 2006; Schuurman 2006; Sheppard 2005; Sui and Goodchild 2003). Critical GIScience constitutes theoretical assessments of geographic technology, information, and systems – and their intersection with society. It is an approach that draws on social theory, science and technology studies, and philosophy. Society is one linchpin that does differentiate critical GIS from theoretical GIS, as remarkably few papers outside the critical GIS realm engage with society at all. And in the beginning, we used the ''GIS and society'' rubric for these types of scholarly investigations (Harris and Weiner 1996, 1998; Sheppard 1995).

A few years ago, I conducted a detailed content analysis of GIScience papers in key journals and publications over an 11-year period (Schuurman 2006). One of the categories I used was ''GIS and society'', very broadly defined. GIS and society papers constituted 49 of 792 papers (6%) among the pre-eminent five journals in our discipline. Papers in this same specialized category in the Lecture Notes in Computer Science GIScience series numbered 2 of 222 (or less than 1%; Schuurman 2006). This remains a puzzle to me, because technology is useless outside of its social interactions (as Facebook, Twitter, and MySpace clearly demonstrate). GIScientists have almost completely ignored this facet of research. So really, there is a huge opening for critical GIS; but it may be that its label is wrong for the task.

For one thing, it is difficult to distinguish ''critical thinking'' from ''plain old thinking'' in academic life. There is a geography department in Canada that has prefixed the titles of many of its human geography courses with the term ''critical.'' On one hand, this is an effective signal that the department has taken up the epistemological gauntlet of postmodernism. On the other hand, implies that the remaining ordinary courses in the department, and across the country, are not critical – which is plainly not the case. My informal poll also reveals that all academics consider themselves critical thinkers. In this instance, the prefix ''critical'' is self-cancelling, like an x on either side of a mathematical equation. My concern is that prefixing GIS with ''critical'' alienates us from those with whom we most wish to communicate.

If we went back to calling ourselves ''GIS and society,'' many problems would be solved – except that not all critical GIScience is about society. For instance, critical examinations of ontologies or algorithmic implications are not necessarily about society; they frequently concern the technology exclusively. An alternative is simply to label our scholarship ''theoretical GIScience.'' Biologists, mathematicians, and physicists have theoretical branches, and many important ideas have emerged from scientists who spent the majority of their time considering the issues and complications that arise as a result of current paradigms. Charles Darwin, for instance, while he

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