

TOWARDS A GENEALOGY OF QUALITATIVE GIS

Matthew W. Wilson

ABSTRACT

By situating qualitative GIS research among the various research trajectories in the 'GIS and society' tradition, I argue that qualitative GIS enacts a specific researcher positionality. In reading this positionality against the original call for a 'critical GIS', I argue that qualitative GIS must continue to problematize its relationship with bits of code and practices of coding. This is a call for a situated qualitative GIS, a genealogical tracing of the multiple rootings of this research and development endeavor. Situating qualitative GIS as a critical GIS, I consider how our relationships with technologies create concerns around the positionality of critique. This is a question of 'insiderness', answered through the call for a kind of insider gaze, which is privy to and constitutive of the terms and terminologies of the technology. To further elaborate how the positionality of qualitative GIS research differs from other work in GIS and society, I discuss three subfields: STS studies, ethno(carto)ographies, and socio-behavioral studies of GIS. Qualitative GIS is distinct in its perspective, what I argue is a techno-positionality. I further discuss how this techno-positionality enacts knowledge production differently, to begin to situate qualitative GIS research, to allow it to speak back to the earlier disciplinary debates about GIS, and to begin to think genealogically about qualitative GIS.

INTRODUCTION

While human geographers are familiar with the historically contingent nature of positions within debate, there is little practical awareness of fundamental limitations that constrain the 'paying of attention' from within a particular position. (Hannah and Strohmayer, 2001: 400).

Like any scholarly contribution to academic literatures, technological innovation can be situated within previous inventions and interventions. Innovation requires our imaginations of futures nearly present and readings of pasts not entirely departed. Qualitative GIS is one such innovation, and this volume speaks to the range of thought currently

working the boundaries of what is considered geographic information systems. Qualitative GIS is, in this sense, both a speaking back to the technological and literary traditions in GIS and a marked departure. This chapter argues that qualitative GIS emerges out of debate, out of the suspicions of disciplinary irrelevance, and out of accusations of reductive empiricism. Our abilities to proceed in qualitative GIS endeavors must be read through these debates, through the anxieties surrounding GIS in the 1990s. As Hannah and Strohmayer discuss in the epigraph, debates in human geography are often aggregated into the positions of the debaters (the regional school versus the quantitative school), which elides the various nuances and differences that articulate the debate. Instead, we resort to epithets – 'critical geographers', the 'GISers', etc. – glossing the possibilities for commonality, and disabling those left at the borders. This chapter anticipates a genealogy of qualitative GIS, to draw in the various discourses that contribute to its emergence, and continue to challenge its pursuit. The point is to be attentive to how our present relationship with geographic information technologies has been enabled through specific inventions and interventions. More specifically, to understand qualitative GIS, we must consider the lines of debate in critical GIS that have led us here.

While preparing this chapter, I was fortunate to attend Enrique Chagoya's *Borderlandia* at the Des Moines Art Center in Des Moines, Iowa. His irreverence to modernist art form and his dramatic use of incongruent elements, typified in works like *Le Cannibale Moderniste* (1999), create a dialogic space for contestation. Against a mock, tranquil Monet background, Chagoya sketches a bleeding and armless Picasso, running from an African woman, baby in tow, feeding on Picasso's arm, while being watched by the floating, severed head of Monet, who is quoting a Mondrian piece. A Disney character sprints away from the scene. Chagoya's technique presents for me a kind of visual metaphor for the spaces constituted by qualitative GIS: spaces of irreducibilities and contestations. Similarly through surprising juxtapositions and artful incongruities, the qualitative GIS of Jung (this volume) and Kwan (2007) enable these kinds of spaces – to challenge traditional understandings of GIS and model new representative practices.

In relating *Borderlandia* and qualitative GIS, I intend to question the work that each performs. What kinds of subjects are assumed and produced through their gaze? What roles are enacted by the viewer and the artist-technician? While Chagoya vividly displays his politics, there are more subtle, political interventions at work. To recognize these disruptions, a viewer of his work must recognize the constitutive elements (the disfigured, modernist painter and the revengeful objects of modernist paintings) to realize their incongruence. It is in this sense, of inquiry about the viewer's positionality, that I want to push back on qualitative GIS. To realize the implications of this subdisciplinary field, the viewer must recognize how what went before is being radically altered. These are the questions at the borderlands: to inquire about relations of insiderness and outsidership in critical praxis, to ask what is enabled by this tension. In order to conceptualize the implications for qualitative GIS, I argue that a genealogy of qualitative GIS must be linked up to critical GIS: an interrogation of the questions and juxtapositions this movement attempts to address and to allow. Doing so not only contributes to our understanding of what is 'mixed' in mixed methods research, but also further considers the implications of this mixing. I choose to begin my telling of qualitative GIS here, as a question of how and who gazes inside the (Arc)toolbox.

EMERGING QUESTIONS OF 'INSIDERNESSE'

Questions of insider and outsider relations *vis-à-vis* GIS have enabled a series of productive critiques in the form of critical GIS, participatory GIS, and qualitative GIS. This questioning has led some in critical GIS to link critique to internal positions that are technically informed, most specifically in the work of Nadine Schuurman. Schuurman (1999) constituted 'critical GIS' as a critical engagement *with* the technology, on its own terms and in its own terminologies. This was a research positionality concerned with 'insiderness'. The way in which qualitative GIS emerges as a viable field of study can be traced to the enabling responses Schuurman offers towards the 1990s critiques of GIS. In this sense, I am calling for a situated qualitative GIS, which is responsible to the critiques and contributions of work in critical GIS. In this section, I consider how critical GIS, as offered by Schuurman (1999) in her research monograph published in *Cartographica*, situates qualitative GIS. I offer two points of departure in this situating, arguing that a qualitative GIS situated as a qualitiveness of GIS theory and practice has implications both for critique and for critical praxis.

First, qualitative GIS can be considered a political intervention. In addition to being a host of technical and methodological considerations for 'out-of-the-box' thinking in GIS development and use, qualitative GIS is constructed by a series of academic debates around the fit of GIS within disciplinary geography. Those advocating a more qualitative GIS are potentially responding to an assumption that GIS is quantitative, or lacks a qualitative capacity – a dichotomy problematized by Pavlovskaya (this volume). Pavlovskaya does not insist that GIS is either quantitative or qualitative; rather, she argues that GIS was always non-quantitative. Her claims to an originally non-quantitative GIS enable, for her, a powerful rethinking of the practice and theorization of GIS. This kind of discussion of the quantitiveness and qualitiveness of GIS is indicative of the kinds of tensions which are important in Schuurman's (2000) critical GIS – to be concerned with the technology on its own terms, in its terminologies. Qualitative GIS, like critical GIS, also serves to remind critical geographers of the importance of *doing* GIS in critical contexts, extending calls for a critical cartographic literacy (Harris and Harrower, 2005; Johnson et al., 2005). Qualitative GIS inherits this tradition, via critical GIS, and enables this critical praxis. By reading qualitative GIS through the lens of critical GIS as it emerges in debate and from contestation, I introduce the second point of departure in situating qualitative GIS – the construction of an *insider gaze* that is privity to and constitutive of the terms and terminologies of the technology.

Second, an insider gaze is central to critical GIS, and enables, I argue, the more recent move to qualitative GIS. I need to preface this claim, however, with the recognition that the critical GIS first articulated by Schuurman in 1999 has now mutated into various forms taking up different dimensions of the 'critical' (qualitative GIS among them). This earlier critical GIS, as bounded by Schuurman's research monograph, is where this insider gaze is manifested. It emerges as a counter-argument to a certain form of critique, whereby the critic is challenged for their positionality in relation to the technology. Schuurman, in her history of GIS critique, provokes a rejoinder to earlier critics of GIS. In her remarks concluding a

review of the GIS debates, she worries that critique which employs language outside the terminology of GIS will not 'gain the ear of GIS researchers' (2000: 587). Critiques of technology must remain 'relevant to the technology', she writes, and to do so, critics of technology must acquire the 'vocabulary of the technology' (2000: 587). Schuurman and Leszczynski (2006) take this call up in later research about metadata standards, highlighting the importance of ontology-based metadata. Here, they investigate the inner workings of these systems, to remain responsible to the issues of the technology.

However, the operative field of critical GIS is constituted through Schuurman's language. She recognizes other forms of critique as in danger of becoming or remaining 'peripheral', and further insists that social theory can 'only tangentially engage a technology which is written in the language of computational algebra and constructed through the laws of physics' (2000: 587). Through the use of territorial markers like 'periphery' and 'tangents', she encourages a policing of the border separating relevant and internal critique from peripheral, tangential, and exterior critique. Her insistence on internal critique is enabled, she argues, through this 'constitutive outside'; in other words, her strategy is precisely to code certain critics and their critique as unsatisfactorily formed with regard to the technology (1999: 10). This typing of critical positions is further reinforced in her collaborative piece with Pratt. Here, Schuurman and Pratt (2002) write in the ethic of Pratt's (1996) earlier piece against 'trashing' as a style of critique. Again, their issue is with the degree of internalness of the critic – a degree measuring the critic's 'care for the subject', in this case, 'the future of the technology' (2002: 295). Their call for a new attitude in GIS critique, as distanced from the 'morally and intellectually superior outsider', constitutes a curious position, defined only in opposition to some differently coded exteriority. Table 9.1 demarcates the boundary between inside and outside, extends these arguments, and lexically casts the strategic field for internal critique in early critical GIS. Internal critiques rely upon an insider gaze and enforce a membership that is more closely aligned with/for the technology, and requires certain technical proficiencies (or at least terminologies). From this vantage point, the critique becomes legitimate and relevant, or simply more palatable.

Feminist geographers are attentive to discussions of internal critique. Kim England (1994; 2002) discusses how our own understandings of self mitigate our abilities (or inabilities) to conduct research. Lynn Staeheli and Patricia Martin (2000) point to the blurring of boundaries between the field and the researcher, and the power relations that underlie this relationship. Staeheli and Martin write, 'positioning oneself in relation to the field ... become[s] [an] immanently political [process]' (2000: 145). This positioning has been described as 'in-betweenness' (Katz, 1994; as cited by Staeheli and Martin, 2000: 146) and as 'borderlands' (Marshall, 2002). Marshall considers insider-outsider tensions a borderland in her ethnographic research; her positionality as the researcher was multiply defined with various human relationships in the study. The status of being *inside* to or *outside* of defined the moments of research, further nuancing Marshall's narrations. In this way, Marshall places insider-outsider relations in dialog in her ethnography. Likewise, Gillian Rose (1997) proposes a reflexivity that problematizes the distance constituted by various borderlands, including insider-outsider positions (and their permutations: see Table 9.1).

Table 9.1 Insider–outsider discourse in early critical GIS

| Insider | Outsider |
|--------------------------------|-------------------------------|
| Vocabularies of the technology | Vocabularies of social theory |
| Care for the subject | Care for the critic |
| Bolstering | Trashing |
| Relevant | Irrelevant |
| Legitimate | Illegitimate |
| Constructive | Destructive |
| Positive | Negative |
| Proximate | Distant |

These two points of departure highlight two ways we might situate qualitative GIS, as a troubling of the kind of political intervention undertaken and of the positionality of critique. I have discussed these departures as emerging from the work by Schuurman to define a critical GIS. More recent work in critical GIS/cartography contributes to new understandings of these departures, particularly new understandings of the 'critical'. The practicing of qualitative GIS might be understood as engaging a kind of double critique, echoing Crampton and Krygier (2005) in their discussion of implicit and explicit cartographic critique. Critique, they suggest, can be understood as both an interrogation of knowledge-making practices and an alteration of these practices in a way that affects change. Qualitative GIS is emblematic of these new understandings, and yet, as I shall discuss, the way in which the 'insider gaze' constitutes its field of operation is cause for further genealogical investigation. We must ask, therefore, what kinds of positionalities are afforded this gaze, and what are the implications for this kind of critical, qualitative GIS? To get on with this mode of questioning, I situate the positionalities of 'GIS and society' research more broadly in the following section.

POSITIONALITIES IN GIS AND SOCIETY RESEARCH

By maintaining that certain critical positions wage more relevant GIS critique, Schuurman (1999) constitutes a site to place her research – what she termed critical GIS – and further invokes a way of thinking about technologies and critique (see also Schuurman, 2006). As a subdisciplinary label, critical GIS marks research which seeks to critique technology through reconstruction – by engaging the technology on its own terms. Schuurman and Pratt (2002) point to examples of research by Sarah Elwood, Mei-Po Kwan, and Sarah McLafferty, where GIS is framed as a non-neutral tool in state–community dynamics and where GIS is mobilized as a tool to interrogate these more material dynamics. These research projects, they argue, are emblematic of a kind of constructive critique that recognizes the transformative potential of the technology itself – a potential recognized through the insiderness of this form of GIS critique. This, as I discussed previously, is a kind of positionality, and one I shall return to in the next section. There are other positionalities in GIS and society research, which take up different relations with the technology. In order to situate qualitative GIS, I discuss how related branches of GIS and society research enact certain research

positionalities in relation to the technology. These positionalities crystallize around specific technology–researcher relationships, or the degree to which the researcher actively reworks the technology as the means or the end point of the research. Here, I propose four clusters of GIS and society research and discuss their specific positionalities: science, technology, and society (STS) studies of GIS; ethno(carto)graphic studies; socio-behavioral studies; and qualitative GIS.

STS studies within GIS research use discourse analysis and actor–network theory to problematize the power–knowledge relationships between science, technology, and society. This research draws upon Latour (2005) and Haraway (1991) to articulate the interconnectivities of technology and society, to historicize their co-embeddedness (e.g. Chrisman, 2005; Curry, 1998; Ghose, 2007; Harvey and Chrisman, 1998; Pickles, 1997; 2004; Poore and Chrisman, 2006). This approach, emerging out of the GIS critiques of the mid 1990s, draws upon the perspective of science and technology to historicize GIS. For example, Poore and Chrisman (2006) advocate a retheorization of geographic information. Their method is one of cautious historicization of metaphors about information: the first being a 'metaphor of invariance', and the second a 'metaphor of refinement'. The former metaphor, they argue, informs the cartography-as-communication tradition, while the latter describes an analytical approach to the production of refined information and eventually wisdom. Here, Poore and Chrisman draw upon STS studies to reveal how these metaphors enabled certain cartographic and GIS practices. They conclude with a social theory of geographic information, acknowledging that 'information is actively transformed and reworked by its recipients' (2006: 520). Their approach, similar to Latour's actor–network theory, is to place these metaphors in relations with other knowledge productions, theorizations, and practices and to challenge the dominant metaphors by revealing what they necessarily hide and disallow. Their position as researchers is to intervene through renewed storytellings of geographic information systems, of their origins and implications.

This form of critique is not an admonishment of GIS; rather, this work seeks to place GIS in broader narratives of global capital, institutional networks, and information sciences. When employing discursive and actor–network analysis, the researcher negotiates a position that actively rereads the histories and implications of technology. This positionality is about reading the technology through various (social) theoretical perspectives, be they poststructuralist or historical-materialist. Schuurman (2000) seems most troubled by this positionality in research. Similarly Leszczynski problematizes this research positionality as one concerned with discourse and not, she argues, with the more relevant 'empirical level of the machine' (2007: 74). STS studies of GIS, from the perspective of the insider advocate, may be criticized as being too distant from the code-based realities of the technology. Their positionality, in other words, remains too divested from the mechanisms of the technology.

It is helpful to read STS studies in juxtaposition with ethnographic studies. Ethnography, or within GIS and society what I term ethno(carto)graphy, is a method popularized due to the belief that ethnographies appropriately place the researcher *within* the process of doing research. Here, researchers attempt to correct or ground their inquiry *in* the phenomena of their study (Herbert, 2000; Marshall, 2002; Matthews et al., 2005; see also Knigge and Cope, this volume). It is also a methodology of collaboration, or of participatory research (Benson and Nagar, 2006; Brown and Knopp, 2008;

Elwood, 2006; Pain, 2004; Williams and Dunn, 2003). As an example of ethno(carto)graphy, Sarah Elwood researches the tactics of community organizations with which she collaborates, analyzing the discursive formulations of 'spatial narratives' or 'the production of spatial knowledge' (2006: 332). She argues that findings in the GIS and society literature are disparate due to dialectical battles between various interpretations of community use of GIS, as 'cooptation or resistance, an activist role or a service delivery role, expert knowledge versus experiential knowledge' (2006: 326). Her methodology is a qualitative analysis of the discourse produced by these agencies' maps and discussed in interviews she conducts. These discursive formulations include various narratives which, Elwood argues, are necessarily spatial: narratives of needs, assets, injustice, accomplishment, and reinterpretation (2006: 332).

Ethno(carto)graphic methodologies are both ethnographic and cartographic – a production of critique through the discursive work that collaborative cartographies enable. The positionality of the researcher in ethno(carto)graphy is explicitly invoked in the process of doing research. Elwood's positionality as a 'technical expert' in relation to the organization bolsters her analysis and findings. Her ability to perform research, therefore, is mediated through this positionality – of being marked both as an insider *and* as an outsider to the process of spatial knowledge production. The ethnographer's implicated position of being a participating observer is one requiring cautious introspect and reflection (Marshall, 2002). Ethnography in GIS and society, as Elwood (2006) demonstrates and Elwood and Martin (2000) discuss, requires an exposed consideration of place and incorporates critical map and critical GIS readings. Ethno(carto)graphy necessitates this positionality of preoccupation with interiority and exteriority as productive of critical research practices.

By some accounts, socio-behavioral studies of GIS maintain a close relationship to the technology. This relationship is one that constructs and configures the codes and practices of the technology itself (Dragicevic and Bařram, 2004; Jankowski and Nyerges, 2001; Nyerges et al., 2006; Peng, 2001). In contrast to STS studies of GIS and ethno(carto)graphies, these studies base much of their legitimacy and relevancy on this relationship. Tim Nyerges et al. (2006) deploy a conceptual framework for analyzing decision-making situations which use software to support decisions about the management of water resources. They argue that ethnography, participant observation, and case studies cannot fully interrogate the use of GIS. Instead, they propose data collection about human-computer-human interaction (HCHI), in what they describe as a socio-behavioral study 'at fine levels of resolution in participatory processes' (2006: 705). To code these processes, the team videotaped the decision-making situation as the software they developed was used. They then coded the sequences on the videotape as it matched the research team's scheme of a 'macro-micro decision process', or general and specific categories of a decision process. Their conceptual framework provided a way to organize their research findings, while their positionality as software developer and 'technical expert' further enabled their proposals for new technical and procedural fixes to a decision-making problem.

From the perspective of the insider gaze, the socio-behavioral researcher positionality is intensely insider. The command and control of the technology in research situations

allow these researchers to build technological agendas for replication and extension. The socio-behavioral researcher makes use of scientific distance in this way, underlining the separation between researcher and subject – all while requiring the insider positionality of technical proficiency. This research is often not framed as critique, due to its own ambivalences about relevancy to the terminologies of the technology. And yet, socio-behavioral research engages the technology in a way that enacts the kind of technological engagement that Schuurman advocates. This presents a problematic for early critical GIS as presented by Schuurman (1999), as socio-behavioral studies of GIS are usually missing from the critical GIS typology of GIS and society research.

Qualitative GIS, I argue, engages a different researcher positionality from the three categories of GIS and society research that I have previously discussed. Returning to the first section of this chapter, where I propose two departures for situating qualitative GIS, I enter qualitative GIS as distinct from other GIS and society research. And yet, it explicitly and implicitly inherits from these three traditions. From an STS perspective, qualitative GIS is a technology *being* situated within its institutional, capitalistic, and disciplinary histories. This perspective enables its recognition as a political intervention. From an ethno(carto)graphic perspective, qualitative GIS is a technology which recognizes the qualitiveness of collaborative knowledge production. It is a participatory action technology. From a socio-behavioral GIS perspective, qualitative GIS implicitly inherits the motivation to alter the technology and the techniques, to change the configurations and propose new specifications. It is a reconstructed technology.

These congeries of partial histories co-shape qualitative GIS. As this edited collection demonstrates, qualitative GIS envisions a qualitiveness of both the content of the GIS and the processes that shape it. In their introduction to a special issue on qualitative GIS, Kwan and Knigge (2006) highlight the border-smashing potential of qualitative uses of GIS, detethering quantitative from positivist epistemologies and qualitative from critical epistemologies (along these lines, see Lawson, 1995; Sheppard, 2001). Active in this account is the notion that research *with* and *on* GIS can invoke qualitative techniques of interpretation, visibility, reflexivity, and contextualization as well as more idiographic pursuits to situate knowledge and knowledge practices. Articles in that special issue examine the potential for GIS to be used critically, as an extension of qualitative research methods (Dennis, 2006; Knigge and Cope, 2006; Pain et al., 2006; also see Bell and Reed, 2004; Kwan, 2002), and further challenges the quantitative origins of GIS (Pavlovskaya, 2006; also this volume). Qualitative GIS, I argue, enables a kind of positionality that is attentive to the ins and outs of geographic information systems, and is motivated to complicate the rules and responsibilities of the software and its practice. Therefore, it is energized by the insider-outsider tension, and yet moves beyond this framing. It necessitates a techno-positionality of a conflicted insider, confronting colliding epistemologies and embracing incongruities. This *techno-positionality* is further taken up in the following section, as I reconceptualize the work of qualitative GIS and highlight the radical openness that those engaged in qualitative GIS seek to embolden.

TECHNO-POSITIONALITY IN QUALITATIVE GIS

By examining the positionalities produced in the different ways of doing GIS and society research, I have situated qualitative GIS in distinction. Qualitative GIS exceeds the insider-outsider tensions that constituted 'critical GIS', and additionally, enacts the researcher-technology relationship differently from other GIS and society research. In this section, I consider what is entailed by foregrounding the qualitiveness of GIS theory and practice, in the work of Jung, Kwan, and Knigge and Cope. Here, I draw on a notion of qualitiveness that is about the embeddedness of practice and the context of counting (Moss, 1995). It is a qualitiveness of fixity. As a system of representation, qualitative GIS necessitates a moment of fixity captured by the image and the database. One might assume that this fixity gives GIS its strength as a tool of generalization and exploration, and yet the question of what becomes fixed, when, and by whom, is a site of contestation. In this tone, qualitative GIS has the potential to work more as a system of re-presentation, by opening up these questions of what, when, and whom (as well as how, and of course where) to multiple authorings and re-creation. Fixity is nuanced here as temporary fixes. While qualitative GIS requires these moments of fixity, it enables a qualitiveness in doing so.¹ It offers an active recharacterization of the underlying logics in GIS. This is a techno-positionality, a research positionality neither of the historical-materialist, nor of the technical expert or embedded ethno(carto)grapher.

Techno-positionality is a positionality in conducting research that is simultaneously about and with the technology. It is 'techno' in the sense that its relationship with technology is hybrid – a taking up of the discourses and the technicalities of the machine. It is a way of *doing* research through 'machinic vision' (Johnston, 1999).² Furthermore, it is a way of *doing* technology as a craft – of practicing technocritique. Qualitative GIS invokes this techno-positionality to recognize how these technologies enable shifts in discourse, while actively reworking the technology to enable an openness to incongruity and irreverence that is productive of new forms of knowledge. As such, this techno-positionality is a conflicted insider – privy to the terminologies of the technology, and yet uninterested in the continuities of the technology. It is a way of relating to technology that is neither entirely inside nor outside, relevant nor irrelevant, constructive nor destructive, in the sense of an earlier, strategic critical GIS, as depicted by Table 9.1.

This 'conflicted insider' techno-positionality is steeped in the technicalities of GIS, and yet seeks resistive practices, new collusions, and irreconcilables to challenge GIS at the level of code. From this perspective, the technology (of hardware and software) is conceptualized as a site of opening, of the possibility for new encodings, interactions, and interpretations. Jin-Kyu Jung (2007; also this volume) and LaDona Knigge and Meghan Cope (2006; also this volume) each move 'inside' the technology to rework what is meant by surface (in Jung's fantastic mosaic of embodied landscapes) and by metadata (in Knigge and Cope's reversal of coordinate-laden ground and ground-laden coordinates). Each challenges what we imagine to be map-like, and yet also brings analytical tools and procedure to bear on these new visualizations. In effect, they have constituted new visualizings. Their qualitative GIS is about multiplicities and contingencies – about joining together previously separated objects and practices.

Knigge and Cope, and Jung, artfully connote a kind of *mashup*. Mashups popularly refer to the cojoining of two or more instances of a particular medium, or of media. For instance, the use of internet map applications for other purposes, beyond the original intent of the map application, constitutes a mashup (Miller, 2006). Mashups become a political intervention in qualitative GIS, as they refigure data, source, metadata, image, and anecdote. Knigge and Cope allude to this conceptualization by describing how, in combining quantitative data with ethnographic data and 'iterative, reflexive rounds of analysis', this refiguration happens and is thereby 'attuned to multiple subjectivities, truths, and meanings' (2006: 2035). While 'mashup' has not been used to describe qualitative GIS research, it is appropriate because the term draws in other efforts in geographic information science (both academic and non-academic), including research in volunteered geographic information (Goodchild, 2007), affective GIS (Aitken and Craine, 2006; and this volume; Kwan, 2007), and web development using Google Maps and Google Earth.³ I site these efforts together as mashups to consider their potential relatedness. Volunteered geographic information (VGI) demarcates a new area of study, emerging from a specialist meeting held in December 2007 in Santa Barbara, California (see special issue of *GeoJournal*, 72: 3–4). Michael Goodchild (2007) refers to VGI as depicting the 'flood of new web services and other digital sources [that] have emerged [and] can potentially provide rich, abundant, and timely flows of geographic and geo-referenced information'. The concern here is with shifting datascares, or new ways of creating, storing, manipulating, and analyzing geographic information. Mashups, a kin of VGI, elude our traditional ways of knowing and seeing. Similarly, Aitken and Craine (2006) and Kwan (2007) have explored alternative (non)representative practices with GIS, to detether GIS from its fixed usages, and further, as Kwan writes, to demonstrate her restlessness with these technologies' involvement in war, conflicts, and surveillance.

These new visualizings mash together different ways of knowing. Much has been written about the epistemology of GIS (cf. Brown and Knopp, 2008; Lake, 1993; Pickles, 1997; Schuurman, 2000; Smith, 1992), and while we can be certain that this is contested terrain, one reason for the appeal and excitement of qualitative GIS is that what qualitative GIS seeks to know challenges earlier epistemological critiques of GIS. Jung's (2007) collage of georeferenced images with systematized relations to a qualitative analysis engine and Kwan's (2007) artful renderings of triangulated irregular networks surprise us. This surprise, a grotesque discourse, enables an active rethinking of *how we know* with GIS. Traditional GIS is often assumed to be positivistic, enabling a separation of subject from object. This separation becomes untenable in these instances of qualitative GIS. The surprises that this sort of technology engenders are due to the shifts in knowing necessitated by such new creations, a kind of playful mimesis. This element of surprise emerges in part due to the breakdown of insider-outsider relations with GIS technologies; qualitative GIS reworks knowledge by using the tools in ways that exceed their original purposes. These multiple claims to knowing, while seemingly incongruous, are foregrounded in qualitative GIS. These incongruities surprise and reveal. Qualitative GIS is an exploration of these incongruities.

Qualitative GIS also challenges our understanding of distance, location, and anecdote. While traditional GIS is assumed to use geometrically determined systems of distance and location, and 'anecdotal' knowledge is stored within metadata, qualitative GIS codes images, anecdotes, and coordinates in ways which exceed systematization. Again, qualitative GIS reconfigures these staples of GIS, to produce knowledges differently. There is no whole story provided by the qualitative GIS, but only a partial and situated storytelling. Knigge and Cope's research (this volume) is emblematic of this kind of reconceptualization (see also Knigge and Cope, 2006). Their recursive analysis with grounded visualization is about situating knowledges and configuring the GIS to bring these multiple knowledges into collusion. The dissonance created by these juxtapositions, and of these reversals of coordinates, images, and anecdotes, provides for them the necessary elements of 'strong conclusions' (2006: 2021). Their qualitative GIS resists the hegemony of flat cartography, by demonstrating how these cartographies are always already interpolated by databases, images, imaginations, and narrative. Qualitative GIS is not only about placing numbers in context, as Moss (1995) has proposed, but also about allowing these numeracies to mingle with the non-numeric.

The techno-positionality of qualitative GIS engages in knowledge-making practices through the mixing of methods and analysis, both to create different knowledges and to permanently alter the technology, materially and discursively. The qualitiveness of such an endeavor underlines its resistance to prevalent discourses that associate GIS with quantification, logical positivism, and technophilia. However, this agenda is not solely being advanced in the academy, as practitioners are already looking to the next mashup and the next widget to capture the qualities of lives lived in Google Earths. Qualitative GIS, and its techno-positionality, are implicated in global capital; see, for instance, the acquisitions made in online mapping technologies (Francica, 2007). It becomes primarily our responsibility, as academics, to continue to open these movements to interrogation and to consider the shifts in discourse that such technologies and techno-positionalities are enabling. There will be new combinations, and new ways of juxtaposing. As a form of critical GIS research, qualitative GIS should continue to inquire about these emerging ways of creating knowledge, to ask: what is symptomatically not seen in this mode of visibility? Who cannot protest? How is this sort of techno-positionality productive of new sightings and silences?

CONCLUSIONS: A GENEALOGY OF QUALITATIVE GIS?

Qualitative GIS is a kind of borderland, marking a space of in-betweenness among GISciences, high-stakes capitalism, and academic disciplinarity – with always shifting modes of practice and theorization. It seeks to make knowledge differently, by opening our accepted ways of knowing to critique. Like the mixed media piece in Chagoya's *Borderlandia* exhibit with which I opened this chapter, qualitative GIS makes use of multiple registers of knowledge production, in a mix of representative techniques. Chagoya's work is, digitally speaking, mashup. He explores, in juxtaposition, the violent limits and injustices of modernity and modern representation. Chagoya's art works through dissonance and epistemological irreducibles. Similarly, the mixing of qualitative GIS serves to alter the original techniques, to engage in technocritique. Intrigued by

the commonalities of these two forms, I have explored here how this technocritique works, and the research positionalities that are constituted through its workings. This is the task of situating qualitative GIS, in the disciplinary trajectories of GIS and society studies, and most specifically critical GIS. It is also the task of imagining qualitative GIS as kin to broader developments in distributed mapping, web GIS, volunteered geographic information (VGI), Google Maps and Google Earth, and emerging geotagging innovations linking fleshly lives to digital ones.

To situate qualitative GIS, I have placed the branches of GIS and society studies in relation to qualitative GIS, to ask how each, as a project, is (dis)similar to qualitative GIS. More specifically, I am interested in the continued project of critical GIS. Therefore, I have attempted to site qualitative GIS within critical GIS, and have proposed that qualitative GIS researchers must continue to problematize their positionality *vis-à-vis* the technology. A genealogy of qualitative GIS must consider how critical GIS, as first articulated by Schuurman (1999) to frame researcher-technology relationships through an 'insider gaze', is now a limiting framework for a qualitative GIS. As a critical GIS, qualitative GIS inherits the anxieties surrounding internal critique, and is bolstered by an insistence on *relevance to* and *legibility through* the technology. Qualitative GIS also shares certain proclivities with STS studies, ethno(carto)graphies, and social-behavioral studies of GIS. As a movement in GIS research and development, qualitative GIS moves beyond this earlier critical GIS in productive ways – in working the tensions of context and contest, images and imaginings, and protocol and protest.

By recognizing this earlier critical GIS as a disciplinary strategy that is timed and placed, we can better articulate how qualitative GIS can address these earlier critiques of GIS while constituting alternative forms of technology. As qualitative GIS researchers, we must recognize the tracings of earlier debates, including insider-outsider ones, that permeate our contemporary projects. Qualitative GIS invokes a different positionality from other modes of GIS and society research, what I have termed techno-positionality. This is the positionality of the conflicted insider, of the performing of research that is simultaneously about and with the technology. This techno-positionality disengages hegemonic practices and representations that permeate the technology. It is a positionality for enacting change through code and through storytelling; it takes discursive materiality seriously and is open to new configurations and problematizations. It is a technology of the borderlands, responsible for the muddying of boundaries and the mixing of methods. These are the messes inhabited by qualitative GIS research – a critical inhabiting to alter our conventions for knowing.

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NOTES

- 1 Thanks to the editors for suggesting 'qualitativeness' here, as it appropriately characterizes the multiple interventions that qualitative GIS enables.
- 2 Thanks to an anonymous reviewer for this point.
- 3 See, for example, the handful of paper sessions at the 2007 AAG Meeting on this topic, including 'Google Earth as the "View from Nowhere"', organized by Martin Dodge and Chris Perkins; 'Virtual Globes', organized by Josh Bader and J. Alan Glennon; 'Visualization and Map Communications', chaired by Molly Holmberg; and 'Mapping and the Internet', chaired by Ron McChesney.

REFERENCES

- Aitken, S.C. and Craine, J. (2006) 'Guest Editorial: Affective Geovisualizations', *Directions Magazine*, 7 February.
- Bell, S. and Reed, M. (2004) 'Adapting to the machine: integrating GIS into qualitative research', *Cartographica*, 39 (1): 55–66.
- Benson, K. and Nagar, R. (2006) 'Collaboration as resistance? Reconsidering the processes, products, and possibilities of feminist oral history and ethnography', *Gender, Place and Culture*, 13 (5): 581–92.
- Brown, M. and Knopp, L. (2008) 'Queering the map: the productive tensions of colliding epistemologies', *Annals of the Association of American Geographers*, 98 (3): 1–19.
- Chrisman, N.R. (2005) 'Full circle: more than just social implications of GIS', *Cartographica*, 40 (4): 23–35.
- Crampton, J.W. and Krygier, J. (2005) 'An introduction to critical cartography', *ACME: An International E-Journal for Critical Geographies*, 4 (1): 11–33.
- Curry, M.R. (1998) *Digital Places: Living with Geographic Information Technologies*. London: Routledge.
- Dennis, S.F. Jr (2006) 'Prospects for qualitative GIS at the intersection of youth development and participatory urban planning', *Environment and Planning A*, 38: 2039–54.
- Dragicevic, S. and Balram, S. (2004) 'A web GIS collaborative framework to structure and manage distributed planning processes', *Journal of Geographical Systems*, 6: 133–53.
- Elwood, S.A. (2006) 'Beyond cooptation or resistance: urban spatial politics, community organizations, and GIS-based spatial narratives', *Annals of the Association of American Geographers*, 96 (2): 323–41.
- Elwood, S.A. and Martin, D.G. (2000) "'Placing" interviews: location and scales of power in qualitative research', *The Professional Geographer*, 52 (4): 649–57.
- England, K. (1994) 'Getting personal: reflexivity, positionality and feminist research', *The Professional Geographer*, 46 (1): 80–9.
- England, K. (2002) 'Interviewing elites: cautionary tales about researching women managers in Canada's banking industry', in P. Moss (ed.), *Feminist Geography in Practice: Research and Methods*. Oxford: Blackwell. pp. 200–13.
- Francica, J. (2007) 'How much is location technology worth?', *Directions Magazine*, 7 October.
- Ghose, R. (2007) 'Politics of scale and networks of association in PPGIS', *Environment and Planning A*, 39 (8): 1961–80.
- Goodchild, M.F. (2007) 'Call for participants: specialist meeting on volunteered geographic information', <http://www.ncgia.ucsb.edu/projects/vgi/>, accessed August 2007.
- Hannah, M.G. and Strohmayer, U. (2001) 'Anatomy of debate in human geography', *Political Geography*, 20: 381–404.
- Haraway, D.J. (1991) *Simians, Cyborgs, and Women: The Reinvention of Nature*. New York: Routledge.
- Harris, L.M. and Harrower, M. (2005) 'Critical interventions and lingering concerns: critical cartography/GISci, social theory, and alternative possible futures', *ACME: An International E-Journal for Critical Geographies*, 4 (1): 1–10.
- Harvey, F. and Chrisman, N.R. (1998) 'Boundary objects and the social construction of GIS technology', *Environment and Planning A*, 30: 1683–94.
- Herbert, S. (2000) 'For ethnography', *Progress in Human Geography*, 24 (4): 550–68.
- Jankowski, P. and Nyerges, T.L. (2001) *Geographic Information Systems for Group Decision Making: Towards a Participatory Geographic Information Science*. London: Taylor and Francis.
- Johnson, J.T., Louis, R.P. and Pramono, A.H. (2005) 'Facing the future: encouraging critical cartographic literacies in indigenous communities', *ACME: An International E-Journal for Critical Geographies*, 4 (1): 80–98.
- Johnston, J. (1999) 'Machinic vision', *Critical Inquiry*, 26 (1): 27–48.
- Jung, J.-K. (2007) 'Computer-aided qualitative GIS (CAQ-GIS): a new approach to qualitative GIS', paper presented at the 103rd Annual Meeting of the Association of American Geographers, San Francisco, California.
- Katz, C. (1994) 'Playing the field: questions of fieldwork in geography', *The Professional Geographer*, 46 (1): 67–72.
- Knigge, L. and Cope, M. (2006) 'Grounded visualization: integrating the analysis of qualitative and quantitative data through grounded theory and visualization', *Environment and Planning A*, 38: 2021–37.
- Kwan, M.-P. (2002) 'Feminist visualization: re-envisioning GIS as a method in feminist geographic research', *Annals of the Association of American Geographers*, 92 (4): 645–61.
- Kwan, M.-P. (2007) 'Affecting geospatial technologies: toward a feminist politics of emotion', *The Professional Geographer*, 59 (1): 27–34.
- Kwan, M.-P. and Knigge, L. (2006) 'Doing qualitative research using GIS: an oxymoronic endeavor?', *Environment and Planning A*, 38: 1999–2002.
- Lake, R.W. (1993) 'Planning and applied geography: positivism, ethics, and geographic information systems', *Progress in Human Geography*, 17 (3): 404–13.
- Latour, B. (2005) *Reassembling the Social: An Introduction to Actor-Network Theory*. Oxford: Oxford University Press.
- Lawson, V. (1995) 'The politics of difference: examining the quantitative/qualitative dualism in post-structuralist feminist research', *The Professional Geographer*, 47 (4): 449–57.
- Leszczynski, A. (2007) 'Critique and its discontents: GIS and its critics in postmillennial geographies'. Unpublished MA thesis, Simon Fraser University, Burnaby, British Columbia.
- Marshall, J. (2002) 'Borderlands and feminist ethnography', in P. Moss (ed.), *Feminist Geography in Practice: Research and Methods*. Oxford: Blackwell. pp. 174–86.
- Matthews, S.A., Detwiler, J.E. and Burton, L.M. (2005) 'Geo-ethnography: coupling geographic information analysis techniques with ethnographic methods in urban research', *Cartographica*, 40 (4): 75–90.
- Miller, C.C. (2006) 'A beast in the field: the Google Maps mashup as GIS/2', *Cartographica*, 41 (3): 187–99.
- Moss, P. (1995) 'Embeddedness in practice, numbers in context: the politics of knowing and doing', *The Professional Geographer*, 47 (4): 442–9.
- Nyerges, T.L., Jankowski, P., Tuthill, D. and Ramsey, K.S. (2006) 'Collaborative water resource decision support: results of a field experiment', *Annals of the American Academy of Political and Social Science*, 96 (4): 699–725.
- Pain, R. (2004) 'Social geography: participatory research', *Progress in Human Geography*, 28 (5): 652–63.
- Pain, R., MacFarlane, R., Turner, K. and Gill, S. (2006) "'When, where, if, and but": qualifying GIS and the effect of streetlighting on crime and fear', *Environment and Planning A*, 38: 2055–74.
- Pavlovskaya, M. (2006) 'Theorizing with GIS: a tool for critical geographies?', *Environment and Planning A*, 38: 2003–20.
- Peng, Z.-R. (2001) 'Internet GIS for public participation', *Environment and Planning B: Planning and Design*, 28 (6): 889–905.
- Pickles, J. (1997) 'Tool or science? GIS, technoscience, and the theoretical turn', *Annals of the Association of American Geographers*, 87 (2): 363–72.
- Pickles, J. (2004) *A History of Spaces: Cartographic Reason, Mapping, and the Geo-coded World*. New York: Routledge.

- Poore, B.S. and Chrisman, N.R. (2006) 'Order from noise: towards a social theory of geographic information', *Annals of the Association of American Geographers*, 96 (3): 508–23.
- Pratt, G. (1996) 'Trashing and its alternatives', *Environment and Planning D: Society and Space*, 14 (3): 253–6.
- Rose, G. (1997) 'Situating knowledges: positionality, reflexivities and other tactics', *Progress in Human Geography*, 21 (3): 305–20.
- Schuurman, N. (1999) 'Critical GIS: theorizing an emerging science', *Cartographica*, 36 (4): 1–108.
- Schuurman, N. (2000) 'Trouble in the heartland: GIS and its critics in the 1990s', *Progress in Human Geography*, 24 (4): 569–90.
- Schuurman, N. (2006) 'Formalization matters: critical GIS and ontology research', *Annals of the Association of American Geographers*, 96 (4): 726–39.
- Schuurman, N. and Leszczynski, A. (2006) 'Ontology-based metadata', *Transactions in GIS*, 10 (5): 709–26.
- Schuurman, N. and Pratt, G. (2002) 'Care of the subject: feminism and critiques of GIS', *Gender, Place and Culture*, 9 (3): 291–9.
- Sheppard, E. (2001) 'Quantitative geography: representations, practices, and possibilities', *Environment and Planning D: Society and Space*, 19: 535–54.
- Smith, N. (1992) 'History and philosophy of geography: real wars, theory wars', *Progress in Human Geography*, 16: 257–71.
- Stacheli, L.A. and Martin, P.M. (2000) 'Spaces for feminism in geography', *Annals of the American Academy of Political and Social Science*, 571: 135–50.
- Williams, C. and Dunn, C.E. (2003) 'GIS in participatory research: assessing the impact of landmines on communities in north-west Cambodia', *Transactions in GIS*, 7 (3): 393–410.

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CONCLUSION: FOR QUALITATIVE GIS

Meghan Cope and Sarah Elwood

INTRODUCTION

From its inception, GIS has been more than only quantitative, and it is now more open than ever to incorporating qualitative data and intersecting with analyses, epistemologies, and theory building drawn from qualitative research. Similarly, qualitative research increasingly incorporates visual representations of space and place, spatially referenced data, and knowledge production practices drawn from cartography, spatial analysis, and geovisualization. Through this collection, we have sought to illustrate some of these creative collisions and to conceptualize the emerging field of qualitative GIS. But the representational, analytical, and conceptual engagements profiled here are just the beginning. These productive collisions of GIS with qualitative research continue to grow, fueled by the creativity and skills of researchers, by technological innovations, and by the expanding prominence of research paradigms such as participatory action research that prioritize flexibility and accessibility in the processes and products of our inquiry.

PRACTICE AND METHOD

Through the projects described in these chapters, the conceptual edges of qualitative GIS begin to emerge, and a repeated theme is that qualitative GIS is constituted simultaneously as practice and method. Both GIS and qualitative research are far more than mere tools; rather, they are constructed and performed in ways that blend practice and method, technique and epistemology, at every stage of research. Thus, when combined in qualitative GIS, they enable new realms of intersection within the social practices of research, such as the ways researchers and research participants make choices about which tools to use, what constitute 'data', whose voices and perspectives get included or excluded, how displays and other representations are put together, the means of communicating results, and what might be the broader implications and possibilities for new forms of knowledge.

Critical GIS scholars have long identified issues of GIS-as-practice as ripe for critique. For instance, some critics have claimed that GIS has been falsely assumed by some users to be a neutral piece of software independent of social and cultural perspectives, values, power dynamics, masculinist world-views, or service to capitalism and military might. Similarly, qualitative research has often come under fire for being anecdotal,