[GS-03-015] Feminist Critiques of GIS

Abstract

Feminist interactions with GIS started in the 1990s in the form of strong critiques against GIS inspired by feminist and postpositivist theories. Those critiques mainly highlighted a supposed epistemological dissonance between GIS and feminist scholarship. GIS was accused of being shaped by positivist and masculinist epistemologies, especially due to its emphasis on vision as the principal way of knowing. In addition, feminist critiques claimed that GIS was largely incompatible with positionality and reflexivity, two core concepts of feminist theory. Feminist critiques of GIS also discussed power issues embedded in GIS practices, including the predominance of men in the early days of the GIS industry and the development of GIS practices for the military and surveillance purposes.

At the beginning of the 21st century, feminist geographers reexamined those critiques and argued against an inherent epistemological incompatibility between GIS methods and feminist scholarship. They advocated for a reappropriation of GIS by feminist scholars in the form of critical feminist GIS practices. The critical GIS perspective promotes an unorthodox, reconstructed, and emancipatory set of GIS practices by critiquing dominant approaches of knowledge production, implementing GIS in critically informed progressive social research, and developing postpositivist techniques of GIS. Inspired by those debates, feminist scholars did reclaim GIS and effectively developed feminist GIS practices.

Keywords: critical GIS, epistemology, feminist geography, positivism, visualization

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Explanation

1. Definitions
2. Early feminist critiques of GIS
3. Revisiting the early critiques and calling for critical engagement with GIS
4. Conclusion: From critiques to critical GIS

1. Definitions

positionality: the idea that the identities of the researchers influence the research process and their interactions with research participants

reflexivity: a process of considering the researcher's positionality and the effects of this positionality on one's research

2. Early feminist critiques of GIS

In the 1990s, critiques of GIS emerged in the midst of the "science wars", a complex series of dispute between scientists and social scientists regarding the epistemological privilege enjoyed by science and the degree to which science is culturally influenced (Schuurman & Pratt, 2002). In this context, critics drew upon various types of feminist and postpositivist scholarships to formulate a critical examination of GIS.

2.1 GIS and positivism

One of the major concerns regarding a possible use of GIS in feminist research comes from the assumption that GIS methods are intrinsically linked with quantitative methods and positivist epistemologies. Critics pointed out the links between GIS origins and geography's quantitative revolution and argued that GIS positivism and empiricism ensue from this relationship. As such, GIS is considered by some as a basic tool limited to quantitative spatial analysis methods. GIS critiques were influenced by feminist skepticism toward objectivity and the neutrality of science and claimed that positivism was an epistemological weakness inherent to GIS. The assumption that positivism underlies GIS was conflated with the problematization of GIS ontological subject object dualism, the fundamental separation between the analyst and the object of analysis (Lake, 1993; Pickles, 1995; Schuurman & Pratt, 2002).

Moreover, critics claimed that some of the principal objectives of GIS methods are to make generalization about the world and to seek universally applicable principles, which translates into the inability for GIS to be used in order to understand subjectivity and difference among research subjects (who then become research objects) (Lake, 1993). As Mei-Po Kwan (2002a) pointed out, if GIS methods are indeed inherently positivist and universalizing and are unable to provide insights on subjective differences (a claim she will contest, see 2.1), they are therefore of little use for feminist geographers, especially when the focus of their research is the spatial production of differences.

2.2 GIS as a masculinist technology

In addition to critiques of positivism, critics have extended to GIS the feminist discourse presenting science as masculinist. Feminist scholars such as Donna Haraway (1991) argued that the exclusion of women from science and the privileging of sight and vision that gives power to the male Western observer resulted in a masculinist bias of science. They claimed that the disembodied infinite vision described as the "god-trick" represents a conquering, voyeuristic, male gaze (see 1.3 for more details on the "god-trick" and critiques the reliance of GIS on vision). Masculinist ways of knowing have also been conflated with scientific objectivity. Relying on psychoanalytic theory, feminist geographers have explored the relationship between geography's visual practice and the masculine desire for and pleasure in looking (Haraway, 1991; Rose, 1992). Drawing upon these radical critiques of science and vision, critics argued that GIS is socially constructed as masculine because the Cartesian space time grid of GIS implies the existence of an external viewpoint over the subject of research. They also argued that by delivering knowledge as data based and

scientific and in virtue of the power and charisma of digital and information technology, GIS presents knowledge in a very authoritative and masculinist way (Bondi & Domosh, 1992; Pickles, 1995).

2.3 Critiques of the power of vision

A third set of issues regarding the use of GIS methods by feminist geographers emerged from the fact that GIS means of knowledge production rely heavily on vision and visualization. Social theorists have critiqued the objectifying power of an elevated vision and the visual appropriation of the world in science in general and in geography in particular. They have emphasized the centrality of vision in creating authority and maintaining order and conveyed the sense of mastery that an observer derives from visually examining the landscape from commanding heights (Kwan, 2002a; Pavlovskaya & St. Martin, 2007; Rose, 1992).

Feminist theorists expanded on those critiques and highlighted the primacy of vision and the reliance on visual technologies in modern society for establishing truth claims in science and sustaining political power. Donna Harraway (1991, 189) has argued that scientific claims to objectivity relies on what she calls "the god-trick of seeing everything from nowhere", a situation where the knower/disembodied scientist is assumed to be able to reach a detached objective view of a completely knowable world while his partiality and subjectivity is denied. Feminist geographers have applied the critique of vision to the use of visualization in GIS practices in general and to the use of remote sensed images in particular. More specifically, GIS has been criticized by feminist geographers for the objectifying way of knowing and the transcendent vision or so called "god's eye view" it enables as well as for the way it permits the distancing of the user from the object of study through vision (Bondi & Domosh, 1992; Lake, 1993; Pickles, 1995).

2.4 GIS data limitations

Feminist geographers also pointed out some of the limitations of data typically used in GIS projects that they thought would make GIS incompatible with some of the key themes in feminist research, in particular with the importance of **reflexivity** and with interest in women's lives. Because of its association with a sterile spatial science tradition, GIS was blamed for promoting a Cartesian conceptualization of space that could not represent relations, networks, connections, or emotions, characterizing women's experiences. It was also claimed that GIS reliance upon maps and remote sensed images would not permit the study of the scales of human activities relevant to gendered patterns of differentiation, such as personal and domestic spaces (Bondi & Domosh, 1992; Kwan, 2002a, 2002b).

In addition, as conventional GIS methods often involve the use of secondary data, reflexivity was thought to be nearly impossible because of the disconnection and lack of interaction between the researcher and the researched (Kwan, 2002b). For instance, feminist researchers have considered problematic the frequent usage of census data in GIS both in virtue of their secondary data nature and because census categories have been criticized for being overgeneralizing and somewhat maladapted to capture the complexities of identities (Kwan, 2002a; Elwood, 2008).

2.5 GIS users and actors

The last major strand of critiques emitted toward GIS relevant to feminist geography

concerns the access to and power over GIS technology. Given their wide use by the military, GIS and geospatial technology have been criticized for supporting structures of power, surveillance practices, and militarism (Pickles, 1995). Concerns were also made regarding the GIS rampant commercialization, its dependence on the private sector for providing hardware and software, and the potential for lucrative consultancy work (Flowerdew, 1998).

Moreover, the predominance of men in the early days of the GIS industry has been pointed out, as well as the quasi-absence of women as either objects or subjects of mapping technologies prior to the end of the 20th century. Overall, the history of GIS has been said to be written as one of men, their innovations, and their advancing of science (Pavlovskaya & St. Martin, 2007). Finally, geographers and social planners have warned that GIS may restrict the information, knowledge, institutions, and social groups that can be engaged in decision making. They have pointed out that GIS often supports a division between the social and the scientific which leads to the creation of a technocratic elite (Pickles, 1995).

3. Revisiting the early critiques and calling for critical engagement with GIS

In the first decade of the twenty first century, feminist scholars have revisited the 1990s critiques of GIS. Instead of discarding GIS on the ground of a presumed epistemological incompatibility with their field of research, they questioned the inherent quantitative nature of GIS and advocated for the development of critical and feminist GIS. As a few critical GIS projects were already showing potential, they advocated that, in contrast to mainstream GIS, such critical approaches could transform GIS into a tool for progressive research and social change.

3.1 Interrogating GIS relations to positivism

While advocating for feminist GIS, feminist geographers re-interrogated the connections between GIS and positivism. Drawing from earlier arguments against a necessary connection between quantitative geography and positivism (Lawson, 1995), Mei- Po Kwan (2002a) rejected the supposedly inherent connection between GIS methods and positivist/masculinist epistemologies. According to her, this association was based on the conflation between positivism and quantitative methods under the quantitative revolution. Instead, she argued that feminist research could be part of the process of separating techniques, such as GIS, from ontological and epistemological positions. Overall, she recognized a connection between GIS methods and positivist epistemology, but according to her, this connection was historically and spatially contingent rather than inherent.

3.2 Bridging the divide between GIS and feminist research

For proponents of feminist GIS, GIS is no more intrinsically masculinist than it is intrinsically positivist. In the same way that feminist geographers dismissed any unavoidable connections between GIS and positivism, Nadine Schuurman (2002) challenged the preconception that technology, and thus GIS, is inherently masculinist by asserting that it is only "as masculinist as we allow it to be." Hence, feminist GIS advocates encouraged alternative GIS practices that, rather than being constrained by supposed masculinist predispositions, would be compatible with, and even inspired by, feminist research.

Nadine Schuurman and Geraldine Pratt (2002) argued that the feminist skepticism towards binary opposition may have a key role to play in developing constructive engagement between critical theories, including feminist theories, and GIS. They advocated for the development of more understanding and open critiques of GIS by GIS specialists in contrast to what they considered to be a "morally and intellectually superior outsider" attitude from previous critics (Schuurman & Pratt, 2002). They pleaded for criticism that would help understand the way GIS works as a knowledge system which in turn would open opportunities to produce truth otherwise.

In order to reconcile GIS and feminist geography, Sarah McLafferty adopted a different approach and examined some of the points of intersection between the two fields which, according to her, "remained stubbornly apart" (2002, 263). Specifically, she identified that both fields give particular attention to geographical context and everyday life grounding in place. Overall, she argues that GIS can enrich feminist research by describing the socio-spatial contexts of women's life. Similarly, Mei-Po Kwan (2002a) claimed that GIS methods are especially well suited to describe and represent context, particularly dealing with fine spatial scale, and enable levels of details and flexibility difficult to achieve with other methods.

3.3 Rehabilitating visualization

In parallel to their counter-arguments to critiques of GIS as positivistic and masculinist, feminist GIS proponents also addressed critiques of GIS transcendent vision. According to Mei-Po Kwan (2002a, 2002c), critics that invoked Haraway (1991) in the 1990s omitted an important aspect of her cyborg manifesto: the possibility for feminists to appropriate the "god's eyes view" and to subvert the views of the master subject. She stressed the necessity to replace the critiques of vision in their social and historical context and pointed out that not all visualizations are objectifying or masculinist, but that vision is always partial and embodied.

Feminist theorists also reclaimed the type of vision enabled by GIS from the abstract. They suggested that visualization could be re-corporealized and situated as a view from the body rather than a view from nowhere (Haraway, 1991; Rose, 2001). Based on those premises, feminist researchers argued that critical and nondominant visualizations become possible, including through the use of GIS. They also pointed out that women can use GIS to produce new visual practices that could better represent gendered spaces, that could adopt a feminine way of seeing, and that would be more reflexive (Kwan, 2002a; Pavlovskaya & St. Martin, 2007).

3.4 GIS and non-quantitative methodologies

In order to further enhance the compatibility of GIS with feminist research, as qualitative methods are often considered more suitable in feminist scholarship, geographers advocating for feminist GIS have reexamined the ties between GIS and quantitative data and the possibilities to incorporate qualitative data into projects relying on GIS methods. First, scholars claimed that, even when relying on quantitative data, the type of visualization enabled by GIS methods allows for a more interpretative mode of analysis than conventional quantitative analysis. For instance, using three-dimensional visualization of individuals' life paths has been shown to be particularly effective to study daily gendered spatio-temporal mobilities (Kwan, 2002a, 2002b). Second, feminist geographers have

advocated for mixed methods projects including GIS. As GIS is suitable to analyze context, its use can inform individuals' lives and experiences in conjunction with traditional qualitative data such as personal interviews. In such cases, combination of GIS methods with other methods allows the decentering of conventional GIS methods while recentering the research question (Kwan, 2002b; McLafferty, 2002). Third, researchers pointed out that recent developments in GIS software started to enable the incorporation of qualitative data, such as video clips and historical photographs (McLafferty, 2002; Kwan, 2002b). Sketch map and mental maps were also increasingly considered as a way to integrate qualitative data in the form of individual spatial narratives to GIS (McLafferty, 2002; Kwan, 2002b). In fact, qualitative geographic information systems (QGIS) have been the focus of research for the past fifteen years and are now considered as a branch of (critical) GIS (Cope & Elwood, 2009).

3.5 Acknowledging the role of women in GIS

Finally, feminist GIS scholars addressed comments pertaining to the predominance of men in the history of GIS by acknowledging the role of women throughout the development of the field. While recognizing that both the fields of (digital) mapping and GIS were and remained dominated by men, they drew from works on the history of mapping as well as from their own knowledge of the GIS community and industry to acknowledge women's presence in these two fields (Pavlovskaya & St. Martin, 2007; Kwan, 2002b; Schuurman, 2002). Marianna Pavlovskaya and Kevin St. Martin (2002) pointed out the increasing numbers of women among GIS corporate executives, although men were still a large majority, and emphasized the high number of women in lower rank GIS jobs involved for instance in map digitizing, quality control, or digital spatial information creation and correction. Alongside Nadine Schuurman (2002), they also highlighted the growing number of women in the field of GIS in academia, both as established professors and as students. For them "acknowledging such a presence [was] the first step toward reclaiming a feminist mapping subject and re-reading contemporary GIS as a feminist practice" (Pavlovskaya & St. Martin, 2007).

3.6 Reclaiming GIS

Altogether, proponents of feminist GIS urged to consider the critical agency of the GIS user and advocated for empowering forms of GIS (Schuurman & Pratt, 2002; McLafferty, 2002; Kwan, 2002c). Mei-Po Kwan (2002b) advised against some form of "technological determinism" that would prevent the considerations of subversive practices of GIS. Scholars argued that a way of resisting dominant practices of GIS resides in the creation of alternative databases and the development of dedicated algorithms, rather than using pre-made datasets and readily available GIS packages. Overall, feminist GIS scholars argued for critical engagements with and a reimagination of GIS as a feminist strategy for reclaiming GIS. In their call for "writing the cyborg", they encouraged feminist scholars, and especially young women, to engage with GIS and to develop GIS practices in accordance with feminist epistemologies (Kwan, 2002b; Schuurman, 2002). In particular, Kwan has argued that such feminist GIS practices should be attentive to bodies and emotions, could take artistic or expressive forms different from traditional representational or analytical ones, and would be able to "challenge the understanding of GT as scientific apparatus for producing objective knowledge or as an instrument of domination" (Kwan, 2007).

4. Conclusion: From critiques to critical GIS

In the 1990s, strong critiques of GIS emerged, relying on feminist and postpositivist discourses to expose power issues embedded in GIS practices and highlighting supposed bias of GIS toward positivist and masculinist epistemologies. In response, in the early 2000's, feminist geographers recontextualized these critiques, argued against an inherent epistemological incompatibility between GIS methods and feminist scholarship, and advocated for a reappropriation of GIS by feminist scholars in the form of critical feminist GIS practices. By the second decade of the 21st century, feminist geographers have largely moved away from debating the epistemological and theoretical compatibility of GIS with feminist scholarship and have turned to discussing more broadly feminist digital geographies and geovisualization (see Elwood & Leszcynski, 2018, for an overview). Meanwhile, many have answered the call for the development of feminist GIS practices and have actually integrated GIS methods in their work in ways that departs from mainstream GIS work. (for examples, see Bagheri, 2014; Ferreira & Salvador, 2015; or Gieseking, 2018). Far from being implemented in a single way, feminist GIS practices are diverse; they are included in mixed-methods projects alongside other types of methods of inquiry, they rely on the development of new visualizations, datasets, and algorithms, and they have permeated through non-explicitly feminist epistemologies. Today, the legacy of feminist engagement with GIS is apparent in every branch of critical GIS and many feminist geographers don't hesitate to incorporate GIS methods in their research.

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