**PPGIS: The Evolution of Public Participation GIS**

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Geographic information systems have become part of the mainstream. From their early days as an expensive custom-built luxury, they have been tweaked and prodded until they are now off-the-shelf necessities for all manner of public and private organizations. As this evolution has occurred, GIS research has also broadened considerably as purely technical issues have given way to research on implementation of the technology. More recently, institutional and societal issues have become important subjects of GIS research. Among the societal issues, concerns that all voices should be heard in a democracy have sparked recent research in "public participation GIS," or PPGIS.

The phrase "public participation GIS" comes to the GIS community from the planning profession. In the mid-1990s, Harlan Onsrud, Paul Schroeder and Xavier Lopez of the University of Maine met to plan a workshop on the subject of how to improve access to GIS among non-governmental organizations and individuals, especially those who have been historically under-represented in public policy making. Mr. Lopez suggested using the phrase "public participation" in the workshop title because of its use and familiarity among planners, who also have a long and close affiliation with GIS technology. As a result, the phrase has since been used to describe a variety of approaches to making GIS and other spatial decision-making tools available and accessible to all those with a stake in official decisions (Schroeder 1997).

The evolution of public participation GIS is a direct outgrowth of the research on societal issues related to implementation of the technology, although it has earlier antecedents as well. The first formal gathering of scholars to discuss this topic was the "GIS and Society" workshop, organized by Tom Poiker, sponsored by the National Center for Geographic Information and Analysis (NCGIA), and held at Friday Harbor, Washington, in November

1993. The January 1995 special issue of *Cartography and GIS* (GIS and Society) reports research and ideas growing out of that early conference. In spring of 1996, the University of Minnesota hosted an NCGIA specialist meeting at Koinonia to develop a research agenda for GIS and society. Several break-out groups formed, one of which was what eventually became known as the public participation group. In summer 1997, the University of Maine node of the NCGIA hosted a workshop devoted to Public Participation GIS. Several of the contributors to this special issue participated in one or more these three meetings.

At its core, the growing concern about public participation GIS centers on the growing role of the powerful GIS technology in a democracy. The key to understanding the importance of the relationship between GIS and society is first to acknowledge that GIS is not just a "tool designed to solve one aspect of a particular problem -- that of translating spatially referenced empirical information into a spatial language to enable cartographic representation of patterns and relationships, and of analyzing the nature of these relationships;" rather, "the development of GIS, or any other, technology is a social process" (Sheppard 1995:6). In the first instance, the inventors and developers of GIS made conscious and deliberate choices about the configuration of the technology based on the societal and technical conditions in existence at the time they were doing their work. The people who developed GIS worked within specific institutional environments (largely white males employed in academic and governmental institutions in North America and Europe) that forged the boundaries of their task. Moreover, existing technology, software logic and specific spatial theories influenced and sometimes limited their choices as they worked. These, in turn, shaped the kind of GIS that are available today.

A number of scholars (Aitken and Michel 1995; Rundstrom 1995; Curry 1995; Weiner et al. 1995; Obermeyer and Pinto 1994; Obermeyer 1995; Pickles 1995) have noted that a disturbing result of this process is that many groups are poorly represented in today's GIS. The use of geographic information systems can make it increasingly difficult for average citizens to participate in ongoing policy debates. This difficulty arises because using GIS simplifies the performance of spatial analysis and the preparation of excellent graphics (maps being the most

obvious example), which lend an aura of persuasiveness to the reports on policy that public and private institutions prepare. No matter how sound (or unsound) the underlying ideas, the GIS can make a report seem more authentic and authoritative than it otherwise might seem. As Monmonier notes, "The map is a robust medium, and even bad maps may communicate, albeit crudely and inefficiently" (1993:3). Individuals and citizens' groups without access to GIS and its cartographic capabilities may find it difficult to challenge such official reports as convincingly, and PPGIS scholars fear that they may lose out in public policy-making.

The potential role of geographic information systems as either a democratizing force or a disenfranchising force is a growing topic of conversation both within the GIS community (Harris, Weiner, et al. 1995; Rundstrom 1995; Obermeyer and Pinto 1994; Obermeyer 1993) and among those with a more general interest in the implementation of information technologies. For example, Cleveland (1987) has detailed the characteristics of information as a commodity that makes it different from other commodities. In particular, the "leakiness" and shareability of data and information make it increasingly difficult for a single entity (whether a public or private group) to maintain a monopoly on information. Cleveland argues that these characteristics will lead to what he calls "the erosion of hierarchies." The most frequently cited example of this erosion of hierarchies is the 1989 uprising in Tiananmen Square in Beijing, People's Republic of China, which was facilitated by fax transmissions that enabled an unusually free flow of information into and out of the country.

The current "public participation GIS" movement in GIS scholarship seeks to develop GIS (sometimes called "GIS-2" or "GIS, too") that will be more adaptable to extra-organizational input from regular citizens and other non-official sources. As the readings in this special issue indicate, the debate surrounding PPGIS draws a generous definition of a geographic information system, including a variety of multi-media technologies.

In April 1998, Cartography and GIS published a special content issue on Public Participation GIS. Currently, a book on the same topic is in the works, the result of a specialist meeting held in Santa Barbara, California in October 1998. The current wave of development

of GIS promises to continue to pave the way for the increased use of GIS by non-governmental organizations in order to influence public policy. For this reason, PPGIS is an important emerging research area in geographic informaiton science.

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