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PPGIS Implementation and the Transformation of US Planning Practice

Laxmi Ramasubramanian

INTRODUCTION

This chapter reflects on the changing nature of planning practice in the USA in order to make the argument that the use of geo-spatial technologies can contribute to make the day-to-day planning practice more efficient, inclusive, transparent, and accountable only when coupled with credible participatory processes. Planning is often accused of serving the power elite exclusively. However, since the 1960s new planning frameworks[1] that explicitly create opportunities for public scrutiny, emphasize transparency and accountability, and invite public involvement have emerged in the USA. In the last two decades, GIS and other digital technologies have been credited with "giving teeth" to these processes. However, it is instructive to note that these positive gains have not come easily or quickly. Consequently, it is worthwhile for the reader seeking to understand participatory GIS implementation to carefully consider how participatory and advocacy planning practitioners have adopted and adapted GIS to effect social change. There is a synergistic relationship between successful technology adoption and use by community groups and changes in conventional planning practice in the USA.

The next section provides an overview of planning practice in the USA. Lacking a clear mandate for planning (in contrast to many other democratic societies), planning as practiced in the USA constantly wrestles with four major dilemmas; the framing of planning problems, identifying the locus of planning authority, defining the public interest, and the management of public participation within formal planning processes. I have previously argued that these ideological, conceptual, and methodological understandings about the nature of participation shape institutional resolutions to these dilemmas. Where GIS and related technologies have been adopted by organizations or government agencies, the technologies are used in ways that reify pre-established understandings of the benefits and limits of participation (Ramasubramanian, 1995, 1999, 2004).

Authors such as Pickles (1995), Graham and Marvin (1996), and Carver (2003) have

proposed that technology adoption must be examined in the context of causal events and resulting socio-political transformations. In keeping with this rationale, I discuss the converging trends and dynamics of GIS adoption by grassroots advocacy groups. The results of technology adoption to address a range of social issues are clear – in advocacy and participatory planning work, GIS is now part of the organizing arsenal required to challenge "official" planning decisions and policies, often generating new data and information. These new forms of evidence have served well to energize citizen activism at the neighborhood scale. Yet, the results are not as clear when we seek to understand the transformative and collective impacts of participatory projects that used GIS, perhaps because published narratives of public participation GIS (PPGIS) adoption and use often focus on the particular case (Craig et al., 2002), that place little or no emphasis on the larger planning frameworks that govern technology adoption and use.

An evaluation framework to understand participatory GIS implementation as a part of larger planning and decision-making frameworks is presented in the next section. The framework highlights the unique ways in which mainstream US planning practice simultaneously creates opportunities and obstacles to long-term sustainability of PPGIS initiatives. I focus my attention on three case studies where GI technologies were implemented to address a wide variety of citizen concerns. I selected these case studies quite deliberately because I am able to discuss details about the socio-political and institutional context of implementation. In addition, I am also able to describe the planning process (as designed and in practice) because of my contributions as a researcher/practitioner to the development and implementation of these projects. This is a reflective exercise of documenting evidence about what happened after the project concluded. The evaluation framework organizes the three separate narratives in order to better understand (1) process, (2) outcomes, and (3) impacts.

The conclusions summarize and synthesize findings from the case studies to reflect on the transformation of planning practice, the ways in which GIS technologies are now deployed and used effectively, and where the use of digital technologies are having a significant impact.

PLANNING PRACTICE IN THE USA

"Planning" is simultaneously an everyday word that communicates a systematic and reasoned approach to problem solving and a discipline with its own set of tools, methods, and processes all of which are designed to guide future action (Dalton et al., 2000). Twentieth-century planning is intricately linked with the development, growth, and management of cities (Hall, 1996). Contemporary planning practice in the USA is also unashamedly normative; where individuals and organized groups have sought to establish their own visions of a preferred future and are working towards that goal.

In the early part of the twentieth century, planning was dominated by social reformers who sought to redress the negative consequences of the nineteenth century industrial city. The earliest planning efforts in some of the most populous and polluted cities of the day including London, New York, and Chicago were directed towards ensuring the health and well-being of all citizens, although the reformers placed greater emphasis on meeting the needs of economically and socially vulnerable populations (Hall, 1996). During the depression and the 1920s and 1930s, planning became identified with integrated management of capital and resources. The Tennessee Valley Authority (TVA) was created in 1933 to develop and implement an integrated plan to meet the needs of a poor region. Its establishment was supported across traditional rural–urban divisions and across party lines (Neuse, 1983). Viewed as a model of "good" planning (Berke et al.,

2000), the TVA model was expanded and exported to other countries such as Brazil and India post World War II, where the focus of planning was the creation and management of large-scale infrastructure projects designed to support regional planning.

In order to meet the needs of returning war veterans, the US government took on an activist role and put in place policies and programs to create affordable housing, educational and work opportunities. These initiatives contributed to, and expanded the growth of suburbs (Jackson, 1985). Subsequently, as suburban populations continued to grow, planning began to focus on the development of a robust transport infrastructure to assist in the safe movement of goods and people between cities and suburbs (Hall, 1996). Comprehensive planning and investment in infrastructure improvements also resulted in the establishment of the Interstate Highway System in 1956 (Federal Highway Administration, United States Department of Transportation, 2006). The Great Society programs of the 1960s championed by President Johnson can be seen as continuation of the social reform movements of an earlier era.

The range of activities subsumed under the word "planning" described briefly above can provide some useful insights and move us towards the creation of a working definition of planning practice. To offer a working definition, planning is a set of frameworks and processes designed to address novel problems in complex contexts, supported through institutional and political power structures in order to accomplish agreed upon goals (based on Alexander, 1992). Planning seeks to create 'better' futures for all citizens (typically considering quality of life issues such as housing affordability, safe and well-paying jobs, safe neighborhoods, and so on), by creating a range of mechanisms (e.g., legislation, guidelines, and new institutions with authority to review and evaluate both processes and outcomes) to ensure that plans are implemented, monitored, and evaluated systematically.

While planning and policymaking are intricately linked, *planning practice*, the subject and focus of this chapter, is bounded by institutional and political norms, protocols, methods, and systems (e.g., demographic analyses, cost-benefit studies, interviews, urban design analyses, consultations, and so on), by spatial references (such as city, town, region, watershed), and by a series of well-defined types of plans intended to serve specific purposes at different spatial scales.

The USA is unique among other industrialized and modern nations in that it has no federal department of planning. Planning activities are split across a plethora of agencies and branches of government. At the local government level, planning includes: comprehensive planning, planning for affordable housing, economic development planning, urban design, zoning, and growth management. It is important to observe that land use planning continues to be in the control of towns and municipalities, emphasizing local control of land planning decisions. At the county and regional government level, natural resource management, investments in infrastructure and transportation, economic development, and growth management are dominant planning themes. The federal government has created a variety of agencies (e.g., Environmental Protection Agency), and has passed legislation (establishment of Metropolitan Planning Organizations)[2] to encourage municipalities to work collaboratively across regions.

Reviewing two centuries of planning thought, John Friedmann (1987) notes that there are four dominant intellectual traditions that shape contemporary planning discourse – policy analysis, social reform, social learning, and social mobilization. The social learning and social mobilization traditions, although they emerge from the right and left of the political spectrum respectively, believe that societal transformation is at the heart of the planning enterprise. Thus, it should come as no surprise that the notion of participation is championed extensively within these two

traditions. Within the social learning tradition, John Dewey's scientific epistemology emphasizing "learning by doing" creates room for public engagement in problem framing. In the social mobilization tradition, the Marxian ideology of class struggle and the neo-Marxian endorsement of emancipatory social movements both emphasize the centrality of collective action at the grassroots. It is within these intellectual traditions that we must situate contemporary participatory planning initiatives.

Public participation in planning

Public participation (taking account of the views of the citizenry) in planning decisions was limited to the power elite during the first half of the twentieth century, although the generally reform-minded planners of this era believed that they were acting in the public's interest (Hall, 1998). Public participation is a slippery term, with no agreed upon definition. At the very minimum, public participation is understood to mean information dissemination and transparency about proposed plans for an area. In ideal circumstances, genuine public participation includes interactive strategies that allow officials and citizens to articulate a shared vision or plan and a process for monitoring plan implementation.

Despite these good intentions, the planning profession has had a long trajectory of developing and supporting large-scale, comprehensive planning initiatives that have gone terribly awry. The destruction of neighborhoods and communities unleashed by the highway building programs and the urban removal programs of the 1950s and 1960s created a justifiable mistrust about professional planning initiatives. The backlash against comprehensive top-down planning of the 1960s and 1970s helped spur the development and acceptance of the culture of citizen participation in planning (Davidoff, 1965). The apparent arrogance of professional planners who sought to define vibrant neighborhoods and communities in bricks and mortar terms alone angered citizens already energized by the *zeitgeist* of the civil rights struggle (Arnstein, 1969; Gans, 1969). The 1960s were a period when ordinary citizens organized and mobilized to challenge the professional wisdom of significant planning decisions (King, 1981; Medoff and Sklar, 1994).

Since the 1960s, when the federal government included "citizen participation" as a requirement in antipoverty programs, citizen involvement in professional planning efforts has been *de rigueur* (Hoch et al., 2000). Furthermore, direct participation in governmental decision-making is viewed as the cornerstone of a vibrant democracy (e.g., Barber, 2004). Yet, it is a concept that seems to have been accepted more in theory than practice. Planning practice interweaves conceptual ideals of public participation within existing decision-making structures, thus resulting in some enduring dilemmas for practicing planners.

Dilemmas in implementing public participation in planning practice

As a practice-oriented discipline, planning is incredibly self-conscious and analytical about its role and purpose. A large body of theory, often called "theory in practice" has been assembled to discuss the core dilemmas that affect all planning endeavors (Schön, 1983). Each dilemma discussed below is linked to some aspect of public participation.

Framing planning problems

Framing a problem has a powerful impact on the solutions that are proposed. Schön and Rein propose that institutional action frames are "beliefs, values, and perspectives held by particular institutions and interest groups from which particular policy positions are derived" (1994: xii). While rational planning is successful, in part, because it helps integrate data and analysis to establish causal

chains, it also is spectacularly unsuccessful when it is required to integrate non-quantifiable, non-economic models of cause and effect, often hidden within institutional action frames.

Community activists, in particular, have long known that it is near impossible to shape outcomes of particular planning studies, because they are framed in ways that can only result in outcomes suitable to the framers. For example, in 1960s, when urban renewal was at its peak, the discussions about the need for urban renewal were cast (framed) as problems of poor housing and living conditions (sub-standard and dangerous structures, health and safety of residents was at risk because of living in over-crowded conditions), wherein the only plausible solution was to remove the decrepit housing stock and replace it with new, presumably, better quality housing. However, intangible qualities such as sense of community could not be factored into any analyses, given that the problem focused exclusively on the built environment.

Determining the locus of planning authority

It is often argued that the rational planning model survives because it "appears to provide a strong rationale for professional expertise" (Hoch, 2000: 23). In the USA, community activists and citizens have consistently challenged the authority of professional planners resisting the dictates of expert-driven, institutionally mandated planning. Advocacy planning, in particular recognized that professional expertise was often used to thwart the challenges posed by average citizens. As a response, advocacy planning as practiced in the 1960s championed a legalistic approach (akin to providing poor/ indigent citizens with the services of a public defender). In this model, "progressive" expert planners argued against other planners working for city government on behalf of beleaguered "naïve" members of the public (Davidoff, 1965). Advocacy planners used the language of expertise to challenge unspoken assumptions, revealed inaccurate and sloppy analyses, and drew attention to the social issues that were being ignored because of the emphasis on physical planning. Planning theorists such as Forester (1989), Healy (1996), Hoch (1994), Innes (1996) have further articulated planning approaches such as collaborative planning and communicative planning to further articulate how planning practice actually occurs within the limits set up the rational planning ethos. Participatory planning, as it has evolved in the 1980s and 1990s validated the voices of experience, that is to say, the voices of those who were directly affected by particular planning decisions (Freire, 1970; Gaventa, 1993). Both participatory and advocacy planning have made some significant inroads in shaping conventional planning processes. Presently, even rational planning models such as the federal transportation planning process have specific opportunities for citizen input and citizen scrutiny. However, the essential dilemma remains – the legitimacy of professional planning continues to be contested terrain.

Defining the public interest

The USA, because of its unique history, and as a relatively young nation, has always been reluctant to subsume individual rights and primacy of private property ownership under law or legislation. Land use (a designation determining the type of use such as residential or commercial) and zoning (a designation determining the height and mass of a building) are often the legal instruments used to implement planning decisions. For the early social planners, zoning was an instrument necessary to protect the general public (ensuring light and air, safe working conditions, reduction of overcrowded housing conditions, and so on) against unscrupulous profiteers. The roots of zoning law, first established in New York[3] were designed to prevent one property developer from designing a building that would block access to natural light and air, thereby affecting the quality of life of residents in adjoining properties.

Later on, these laws were expanded when the Village of Euclid, Ohio, zoned land to preserve community character by imposing height and density restrictions. The ensuing 1926 Supreme Court Case (*Euclid* v. *Ambler*)[4] which upheld the rights of the Village of Euclid established the need to protect the public interest against individual owners or developers who, in their desire to maximize profits, were likely to ignore concerns about health, safety, and quality of life concerns. Eminent domain, the taking of private land for public purposes by government is highly controversial. It has often been used for the development of large-scale infrastructure or transportation projects which require large scale assemblages of contiguous land. More recently, in the 2005 Kelo case (*Kelo* v. *City of New London*)[5], the US Supreme Court ruled that the community's desire to support economic development justified the taking of private land using the principle of eminent domain. As planners strive to represent the needs of the many, including those who are not present (under-represented populations and future generations), the concept of the "public interest" continues to be negotiated and re-defined to suit particular situations and contexts.

Management of participation within formal processes

While citizen activists and special interest groups vociferously clamor for increased opportunities for participation, there is a growing and uncomfortable realization that citizen participation has become a series of formalized bureaucratic rituals (e.g., designated periods for public comment) that are ineffective and sometimes counter-productive (Innes and Booher, 2004). Many professional planners are beginning to observe that public participation as currently managed undermines their professional expertise, reducing them to "glorified event planners".[6] Planners working in public agencies continue to be uneasy about opening up professional planning processes to the general public. Carp (2004: 242) explains these attitudes thus; "public participation costs time and attention; and to the extent that it introduces political and interpersonal complexities into decisions, it compromises planners' autonomy and efficiency." In addition, planners are also concerned about raising expectations among citizenry by promising more control over a project that can realistically be delivered.[7] Finally, planners working for government agencies are also ambivalent about citizen participation because their counterparts in the community (advocacy planners working with/for communities) continue to maintain an adversarial relationship with them.[8]

USING GEOSPATIAL TECHNOLOGIES FOR PUBLIC PARTICIPATION

The adoption and use of geo-spatial technologies (ranging from early desktop GIS applications to contemporary sophisticated web services that define the contemporary trend) are best understood when they are embedded within the larger context of the digital revolution.

The digital revolution and the digital divide

While the emergence of the Internet and the World Wide Web is often credited with increasing public participation (Mitchell, 1995; Negroponte, 1995; Toffler and Toffler, 1995), many others have argued that the digital revolution has contributed to the isolation and marginalization of individuals and communities (Shenk, 1997). From the beginning these debates have been polarized because of competing ideologies. Unsurprisingly, the reality of technology adoption and its use has been far more complex. On the positive side, Rheingold (1993) argues that digital communities provide *social network capital* (the capacity to meet others with similar interests), *knowledge capital* (the capacity to get on the

network and ask for help on a range of subjects from a gathered group with diverse experience and expertise), and a sense of *communion* (being supported emotionally by an invisible community). To some extent, the Internet also leveled the playing field between "information haves" and "have nots" by democratizing access to data and information.

Access to the Internet is not evenly distributed. The so-called "digital divide" has been identified in terms of a lack of access to technology (Norris, 2001) and the skills to use the technology (Mossberger et al., 2003). Based on data from the Pew Internet and American Life Project, Mossberger et al. (2008) report that "twenty-seven percent of Americans still do not go online at all and are therefore completely excluded from participation in society online." These revelations have broadened discussions about access to consider the social and institutional contexts that can either provide or impede access to information. Likewise, the ability of the individual or group to be able to interpret and thereby use the information they have managed to obtain (sometimes discussed under the rubrics of digital literacy or digital citizenship) are also topics that concern practitioners and policymakers who want to promote easy access to planning-related information. Presently, discussions about access includes topics such as freedom of information, individual privacy rights, the commodification of information, data quality, data sharing standards, spatial literacy, and the role of intermediaries (e.g., nongovernmental organizations) in assisting the public to gain access to information (Craglia and Masser, 2003; Ramasubramanian, 2007).

The history and evolution PPGIS practice in the USA

Public participation GIS is an awkward phrase that came to encapsulate the intersection of community interests and the widespread adoption of GIS technology. As one reviews the social history of the field, it is interesting to note that the name choice PP+GIS emerged from the planning field[9] (Obermeyer, 1998). The early origins of PPGIS were focused on harnessing the capacities of GIS to serve community interests, while remaining cognizant of the potential limits of the technologies themselves. Even an exhaustive review of the field (Sieber, 2006) failed to provide a clear definition of PPGIS, opting instead to characterize PPGIS as a field or a broad umbrella of practice activities, emerging from various disciplines and driven by disparate agendas.

Despite ambiguity about its nomenclature (fortunately limited to the academic enterprise), PPGIS adoption, or in other words, community-focused GIS adoption grew rapidly in the early 1990s benefiting from the larger technology growth trends of the 1990s and was supported by the investments made by the federal government in the areas of education, health care, business, commerce, and environmental management, and in community development.[10] For example, between 1995 and 2000, US Department of Commerce[11] funded over a hundred projects including demonstration projects, community networking projects, and infrastructure development projects all designed to improve electronic telecommunications and showcase the advantages of connectivity.

One of the earliest descriptions of IT applications designed to serve "low income" communities came from Richard Krieg (1995). Although the "PPGIS" terminology was not used in his survey, many of the applications and functions listed are examples of community-oriented spatially referenced information systems. At the time of Krieg's survey, many providers and consumers of information strove to bridge the digital divide by providing free or low-cost access to e-mail and the Internet. Other applications required users to be at particular physical locations to access services (e.g., the offices of community agencies, public libraries, and other high volume access points). While technology (the hardware) was seen as a primary barrier to bridging the

digital divide, other barriers such as software, technical, and literacy skills, as well as access to data were beginning to be recognized. The federal government's investment in technology access projects during this period cannot be underestimated. At the same time, community-based organizations in the USA were being challenged to take on additional service provision and advocacy responsibilities with limited resources. Creative community-based organizations were quick to explore the potential of emerging technologies to help achieve organizational goals. In some instances the traditional funders of community-based organizing and development provided funding for technology-related projects while industry provided hardware and software donations.

By 1995, the US Department of Housing and Urban Development was requiring community-based organizations to develop applications to demonstrate community need in order to be eligible to receive block grant funding. Community organizers discovered that by mapping census data and integrating it with additional information gathered from other city and county sources, they could begin to create a narrative that better described neighborhoods in need. Thus, the mid-1990s efforts tended to map misery (e.g., crime, socioeconomic deprivation) quite effectively with the goal of drawing precise geographic boundaries to target areas of greatest need. However, they spurred a culture of data driven analysis of social issues that facilitated data gathering and data integration. Many of the nation's smaller cities also received support for these efforts from philanthropic institutions. The planning literature cites a plethora of small community-focused GIS activities (e.g., Myers et al., 1995; Talen, 2000). Many of these case studies including PPGIS work with community-based organizations in several US cities are found in a compendium of community participation and GIS edited by Craig et al. (2002).

In the nation's larger cities, comprehensive community building initiatives also encouraged data collection, integration, and a managerial approach to social problem solving.

Community-based organizations began providing access to real property and infrastructure inventories on stand-alone computer to better understand the dynamics of neighborhood change. Using an indicators-based approach, community groups were able to target physical interventions that were intended to address social problems (e.g., removing abandoned/boarded up houses to reduce risk of arson or drug crime). These systems eventually evolved into Neighborhood Early Warning Systems which were adopted in many cities such as Minneapolis, Chicago, Philadelphia, and Los Angeles among others (Snow et al., 2004).

Sawicki and Peterman (2002) using data from a 1998 national survey designed to assess the extent of PPGIS practice report that a wide range of nonprofits, some affiliated with universities, as well as some government agencies were engaged in some kind of PPGIS activity. The 18 university-affiliated projects identified in the Sawicki/ Peterman study included centers that provided mapping and technical assistance services such as the East St. Louis Action Research Project[12] (ESLARP), and Neighborhood Knowledge Los Angeles[13] (NKLA). By this time, the web had matured to support Internet based data delivery and city agencies were just beginning to get involved in data provision and dissemination via the web, with the lead being taken by federal departments and agencies such as the US Census Bureau, the US Department of Housing and

Urban Development, and the Environmental Protection Agency.

Nonprofit organizations such as community based service providers and advocacy groups now play an important role in facilitating PPGIS efforts. Local data providers often create customized data sets that organize information relevant to a particular population subgroup (e.g., caregivers of young children) or by

geographic boundaries that are more easily understood by ordinary citizens (e.g., neighborhood areas rather than census tracts). Community data centers are also repositories of rich local and contextual knowledge.

Community archives often include geo-referenced information not available in official records through oral histories, drawings, sketches, photographs, as well as video and film clips.

In 2007, the trend documented by Sawicki and Peterman continues; PPGIS projects continue to be linked to academia; the London Air Quality Network[14] and Living Independently in Los Angeles[15] are but two examples of this trend. However, there are a whole range of PPGIS applications that are the result of innovative work by individuals who have integrated two or more disparate sources of data to create new web-based services. These applications, often called mashups[16] address specific community aspirations. Examples include Chicago Crime Map[17], Trailhead Finder[18], and HotSpotr[19], and their number continues to grow. In some of these instances, the data is provided from existing public sources. For example, the Chicago Crime Map data comes from the Chicago Police department, although the Chicago Crime Map is not an official source of crime information. In other instances, data is willingly provided by individuals who participate in the initiative by entering information into an online database (e.g., where users enter data about wifi hotspots). There is great interest in the use of such volunteered geographic information to energize and foster PPGIS activities.[20]

ESTABLISHING AN EVALUATION FRAMEWORK

Goals and purpose

In everyday terms, evaluation consists of systematic and careful assessments of individuals, projects, programs, and/or policies. Evaluation research emphasizes rigor, integrity, transparency, and systematic gathering of evidence to support conclusions. Evaluations are always purposeful; therefore evaluation methods must be appropriate to meeting stated goals. Evaluation research emphasizes respect for people and institutions participating in the evaluation process. Evaluation can be formative (with a goal of assisting participants refine and develop a better process) or summative (with a goal of assessing impacts and outcomes of a particular program or programs) (Werner, 2004).

During the 15-year time frame that participatory planning using digital technologies have been in vogue, the overt goal has always been individual and community empowerment. However, the empowering qualities of PPGIS work are difficult to evaluate, in large part, because PPGIS activities are often embedded within larger initiatives with broader organizational goals. In addition, it is difficult to document intangible benefits that accrue from a particular project and develop a causal linkage with a specific PPGIS activity. In addition, there appears to be resistance in subjecting PPGIS case studies to a uniform evaluation framework, because it is argued that the situational context and goals of each PPGIS project are unique enough to limit any generalizability. There is some truth to this position, for instance, it would be unproductive to compare PPGIS activities in small fishing villages in Indonesia with the work of community boards in New York City. Despite these limitations, I propose that it is reasonable to compare and evaluate PPGIS projects in the USA using a common framework because we share a common spatial data and technological infrastructure and are united under the planning paradigms discussed previously.

There are many activities that are labeled PPGIS and there is great confusion among practitioners about what constitutes a PPGIS activity. While there are many researchers developing tools and methods to support

PPGIS work (e.g., Lowry et al., 2009) that may or may not involve active public participation, an ideal PPGIS project is a participatory planning project that is supported with digital technologies. At a minimum, it should include the following ingredients:

1 develop the capacity of the participants to organize, analyze, and discuss planning concepts to the level required by the particular endeavor they are involved;
2 engage participants in every aspect of the planning process, that is, in framing the project goals and the methods that are selected to examine and investigate these goals, in project implementation, and assessment;
3 develop techniques to carefully incorporate participants' views and participant-generated data into formal planning processes, and;
4 provide clear and transparent strategies for data generated from the project to be available to the participants.

Akin to Arnstein's (1969) ladder of political participation, and Voogd and Woltjer's (1999) guidelines for ethical planning, the definition of the ideal PPGIS project stated above, are a set of goals that all projects/ programs can aspire to meet. Using this definition, the purpose of the evaluation is to capture the unique as well as the ubiquitous ways in which PPGIS-based advocacy work has transformed the day-to-day planning practice in the USA. By examining if and how neighborhood and community institutions have altered or changed their established practices because of their exposure to, and use of geospatial technologies, I seek to highlight both positive and negative impacts of PPGIS adoption and use. Furthermore, by examining the extent to which PPGIS practices are successfully established within the day-to-day vernacular of institutionalized planning practice, I hope to stimulate a more robust debate about the best ways to better embed the use of participatory planning methods and geospatial technologies within planning and decision-making processes.

Framework

There are three main components that anchor the evaluation framework: first, I ask, what is the *process design* that was used to introduce geospatial technologies within a specific organizational or institutional context? In other words, how was the program planned and developed? Second, I ask, what is the range of *short-term outcomes* that emerged immediately after the program or PPGIS implementation effort concluded? Were these gains and losses planned for/anticipated or were there unintended consequences? Finally, I ask, what are the *long-term impacts* of these efforts after some time has elapsed? Are there lasting, observable changes in planning practice that can be attributed to the adoption and use of a participatory process using geospatial technologies?

Process

Planning that precedes introduction of geo-spatial technologies to a community is critical to the success or failure of the implementation, an observation extensively supported by researchers (Rogers, 1983; Onsrud and Pinto, 1993; Obermeyer and Pinto, 1994; Campbell and Masser, 1995; Huxhold and Levinsohn, 1995; Harris and Weiner, 1998 among others). Non-technical factors including the presence of GIS champions, skills and motivation of users, technological congruence with organizational needs, leadership support for information-driven solutions, and political imperatives all affect implementation efforts. The challenges are far greater for PPGIS adoption and use, because PPGIS practice includes the additional obligation/burden to include credible participatory processes within the implementation effort. Thus a PPGIS implementation must be preceded by careful and conscious attention to process, in which the roles and mandates of participants are clearly defined. In the USA, good PPGIS practice is modeled after good community development practice, wherein PPGIS advocates can serve as community organizers (Rivera and Erlich, 1992). In addition, PPGIS advocates concerned about long-term

sustainability will attempt to link and integrate their work to on-going planning initiatives that are underway.

Short-term outcomes

The introduction of new technologies and innovations often promises efficiencies – in terms of use of staff time and resources. More significantly, GIS has been most productive in routine task automation, a feature used effectively in the day-to-day business of planning (Huxhold, 1991; Ramasubramanian, 1999). Evidence of these efficiencies can be observed in customized map production using data that has been assembled and organized from data providers. These efficiencies are increased with the advent of the Internet, a transformation which has moved PPGIS away from individual desktops to the interactive public realm. Examples of such Internetbased data providers include the US Census American FactFinder (for socio-demographic information) and DataPlace™ (for housing and community development information). Localized community-based data providers abound, although data quality is variable. Even if one assumes that PPGIS advocates may be able to achieve efficiencies in some routine tasks, benefits are gained only if they redeploy time and resources to meet other needs (like reaching under-served populations or conducting more thorough analyses). Information dissemination is another short term goal that most PPGIS advocates should seek, specifically to get their issue heard by a wider audience; to engage multiple publics; to foster conversations and debates about the issues. A third short-term outcome would be an immediate successful resolution of a problem or controversy. In policy controversies such as the need to achieve social equity goals, data-driven analyses can result in "quick wins." In this context, the creative use of digital technologies to support multiple or alternative representations of the issues would be a short-term impact. Negative impacts too must be considered in analysing short-term outcomes. Project cost overruns, technical problems, staff burnout, exacerbation of existing tensions within communities are examples of likely short-term outcomes that PPGIS advocates must strive to avoid.

Long-term impacts

Essentially, long-term impacts can be grouped into two categories – impacts/changes to process (the ways in which planning takes place), and impacts/changes in policies and programs. These long-term impacts are those gains that inspired the initiative in the first place, but may not have been accomplished when the initiative was concluded. Thus, if the goal was to create a more transparent and inclusive planning process, then a long-term impact would be the creation of mechanisms and processes that support such inclusive planning. Examples of such impacts include the creation of community councils to monitor planning initiatives or the inclusion of a review/comment phase in a process that formerly did not include that component. Likewise, long-term impacts are the establishment of policies and programs that were deemed desirable goals when participatory initiatives were initiated. Examples can include changes in policy to achieve social equity/ social justice goals, or the creation and support of programs to monitor such goals. With this framework, a review and analysis of three case studies will provide the much needed context to anchor discussion and synthesis.

THE CASE STUDIES

Overview of cases

Three case studies are introduced and described briefly in this section. In each case study, geo-spatial technologies were adopted and used to achieve specific planning objectives. These cases were chosen strategically to illustrate and explicate the usefulness of the framework discussed

earlier. Since the framework requires that attention be paid to process, short- and long-term impacts, I selected cases where I have extensive in-depth knowledge about the context of the case and personal familiarity with many of the activities undertaken to achieve project goals, as a participant-observer, or as an architect engaged in implementing the PPGIS initiative. I have elaborated on the South End Community Organization case in Ramasubramanian (2004) and the Oak Park case is discussed in greater detail in a book chapter by Ramasubramanian and Quinn (2006). One of the shortcomings of using familiar cases is the possibility of bias, of reading into the situation, particular meanings and interpretations that confirm previously held opinions. To avoid bias, I have taken care to provide corroboration (through documentation or using direct quotes from interviews) to support my observations. The long-term impacts, in particular are based on conclusions drawn from archival material since many of the participants and initiators of the participatory activities are no longer involved with the projects and in one case, one of the key initiators of the participatory work is no longer alive.

South End Community Organization,[21] *Boston*

Boston's South End neighborhood was initially conceived as a high-income residential enclave, modeled after London, intended to counteract the exodus of wealthy Bostonians to the suburbs. However, as early as 1866, the South End had become a mixed-income neighborhood, accommodating an influx of poor residents, and subsequently became home to successive waves of immigrants.

In the 1950s and 1960s, the South End was beginning to be viewed as a neighborhood in decline and ready to be "renewed" by city planners, even though over 8000 South End residents (mostly Black, Hispanic, and immigrant) who considered it home would be unlikely to ever find suitable housing there again, given the prevailing social and economic conditions. The urban renewal projects proposed by city planners sought to remove "blighted areas" by targeting tenement houses and other housing options available to working-class people. This removed about one-fourth of the neighborhood's housing stock (in terms of dwelling units). Medoff and Sklar note, "Neighborhood tensions rose as the Boston Redevelopment Authority's demolition work outstripped its promises of relocation and affordable housing. The tension wasn't over whether to renew the South End, but how and for whom?" (1994: 20).

At the time this research began in the early 1995, the South End Community Organization (SECO) operated as one of the service centers for Action for Boston Community Development (ABCD). SECO's Housing and Planning Coalition emerged almost as a direct response to the BRA's new planning strategies in the 1980s. The BRA created Planning and Zoning Advisory Committees to help formulate plans for individual districts (Kennedy, 1992: 225). The agency also established a community planning process in which city planners received the input from various neighborhood groups and then came up with a "rational" plan for the district. The BRA also instituted a public review process in which developers presented their design schemes and alternatives to meet public scrutiny and approval. SECO became active in monitoring community planning processes in the South End. Specifically, SECO monitored compliance of developers who had previously established commitments to create low and moderate income housing within their development projects.

In the late 1980s, the BRA and the Flynn[22] administration had began exploring additional opportunities to spur economic development in Boston. The administration argued that developments in the area of biotechnology/biomedical research would create jobs for Boston's unskilled and semi-skilled populations clustered in the

neighborhoods of South End/Roxbury. Building on this concept of planned economic development in the area of biotech/biomedical research, the BRA approved the development of South End Technology Square (SETSA). This was a multi-year, multi-phase project initiated by a consortium of private developers, including Boston University.

When SECO became involved with the community planning process for SETSA, the agency found that they lacked information and an understanding of the effects of biotechnology/biomedical research, particularly its potential to generate jobs for South End residents. Subsequently they engaged the services of an independent consultant (a planner) to investigate the issue.

One of the consultant's key findings unequivocally stated,

> 'the expansion of the biomedical industry in Boston will improve the city's economy but its corresponding job growth will not benefit the majority of Boston residents who are in need of jobs because the educational level of [these] residents will not match the educational requirements of the biomedical industry'. (SECO, 1991: executive summary)

The report's thoroughly researched and well-articulated findings (based on comprehensive geo-spatial analyses) provided SECO with a negotiating chip which they used to garner additional community benefits to improve the quality of life of South End residents. At that time, SECO's executive director said:

> We did something, since we knew we would not get jobs, one of the things we asked for was that they use their influence to help locate and finance a new state-of-the-art community health center. The ground will be broken on that this year.
> (Interview, March 1996)

Maps and powerful graphics are sometimes used to inform, educate, and attract the attention of residents and outsiders towards the work of the organization.

A South End resident observed:

> [Maps] put into graphic form some of the stuff we know, or don't always know, about what's going on around us. The older maps are nice because sometimes they show the configuration of the housing before they took it all away. It's a kind of history … Then there are those maps that go way back and show changes from various different times …. (Neighborhood resident's interview, 1996)

SECO's executive director and planning consultant were both ardent proponents of map use to communicate ideas and planning issues.

> Most people in other neighborhoods and community organizations devalue, not that they devalue; they don't realize the value of graphics. [Our consultant] did a chart … I remember, in the 1980s … it showed an affordability gap in this neighborhood between income and cost of housing. And it showed it over several decades. Well, see; I retain [the map] in my mind's eye because of the graphics. I think graphics are undervalued. (Interview, 1996)

> Maps are representations of reality. I customize maps; I include [qualitative] information, pictures, and integrate data and statistics with issues … like crime, like housing. (Planning consultant's interview, 1996)

SECO fell back on data and information to clarify perceptions, prove or disprove claims and allegations, and measure trends. These observations from one community organization are consistent with national trends from that mid-1990s time period; community based organizations in several US cities were using data from various sources in order to challenge established planning orthodoxy.

Planning together, Oak Park Illinois

The Village of Oak Park is a small but vibrant community of about 50,000 people. The village, a municipality adjoining the City of Chicago is probably best known for having the largest assemblage of Frank Lloyd Wright homes and buildings including the Unity Temple and Wright's own residence and studio (Village of Oak Park, 2007). The village is known to be politically and socially progressive; for instance, Oak Park is one of the earliest communities in Illinois that passed a fair housing ordinance in 1968 and

has worked carefully and proactively to sustain residential integration despite numerous difficulties (Squires et al., 1989; Williams, 2007). The Oak Park diversity statement, adopted by the village president and the board of trustees in May 2005 is a further affirmation of that original commitment to social integration and active citizen engagement in planning and decision-making.

> …. Oak Park has committed itself to equality not only because it is legal, but because it is right; not only because equality is ethical, but because it is desirable for us and our children….
>
> Oak Park's proud traditions of citizen involvement and accessible local government challenge us to show others how such a community can embrace change while still respecting and preserving the best of the past. Creating a mutually respectful, multicultural environment does not happen on its own; it must be intentional. Our goal is for people of widely differing backgrounds to do more than live next to one another. Through interaction, we believe we can reconcile the apparent paradox of appreciating and even celebrating our differences while at the same time developing consensus on a shared vision for the future. Oak Park recognizes that a free, open and inclusive community is achieved through full and broad participation of all its citizenry. We believe the best decisions are made when everyone is represented in decision making and power is shared collectively … (Excerpt from the Village of Oak Park Diversity Statement, 2005)

The goal of the Planning Together project (the subject of this case study) was to develop character plans for two business districts in two distinct neighborhoods within the village. While the process was initiated by a range of citizens who argued for the need for such proactive planning to spur economic development in these two neighborhoods, the village initiated the action by inviting the local university (University of Illinois–Chicago) to design and implement the planning process. While interest and commitment to integrating new technologies came from early adopters at both community and university, the technology agenda was not driven explicitly by the community or the village's planning staff. Rather, the integration of technology in the project evolved, waxed and waned organically over the lifecycle of the project. The complete project report is available online.[23]

In this brief summary, I describe and discuss aspects of the planning process as well as the interactive digital applications that were developed because they collectively have helped to transform how planning is done. The need for process within participatory planning projects cannot be overemphasized. In this case, the project planning team developed a set of guiding principles that shaped every aspect of the process. These guidelines were not abstract ideals but were adhered to by all members of the planning team. These were:

1. fairness (ensuring that all participants had equal opportunity to express opinions, ideas, and advice);
2. respect (acknowledging and recognizing participation of individuals and groups, regardless of their particular points of view they espoused);
3. inclusion (including the interests and voices of those directly affected by proposed plans, but also making the efforts to include interests and voices of those who did not participate, or whose participation did not receive meaningful attention);
4. relevance (focusing of citizens' testimony, advice, and deliberation on issues related to the purpose and context of the project); and,
5. competence (soliciting, supporting, and using the skills and knowledge of participants to improve the quality of the process and the creation of the plans).

The project planning team helped create and sustain two stakeholder groups, one of each targeted neighborhood development effort. The stakeholder groups were designed to include a broad swath of the community and were seeded with individuals who were part of the community but also had specialized expert knowledge that they could offer to the group. The project planning team developed a series of interactive digital applications. Examples of applications developed for this project include customized web based visual preference surveys; online sketch planning tools; planning portals; and a project website. Many of these tools have

been presented at the PPGIS conferences[24] in Portland (2003) and Madison (2004). Collectively the digital applications assisted in envisioning the immediate and long-term future for these two neighborhoods, discussing the advantages and disadvantages of particular planning changes. For example, a high-impact scenario visually and quantitatively showed how new development could be scaled up to generate new tax revenues that could benefit the village as a whole while highlighting the quality of life issues (traffic, displacement, and so on) that would be compromised in the immediate vicinity of the development in pursuit of these goals (Ramasubramanian and Quinn, 2006).

The project concluded in August 2003. The village board trustees voted to receive the character plans and directed the Plan Commission to review the plan's recommendations. At a hearing about the plans, the chair of the Plan Commission reported that, "among those who participated, there was 'absolute consensus' that it (the year-long effort) was a wonderful process and that it worked well. Many people came together to try to attain consensus about some difficult issues; it was a positive process" (Village of Oak Park, 2004).

Common ground: creating a regional plan for 2040, Chicago, Illinois

The Chicago Metropolitan Agency for Planning (CMAP) has a jurisdiction over seven counties, extending over 3750 square miles and serving a population of eight million people spread over 272 local governments. The agency was created in 2007 bringing together the Chicago Area Transportation Study (CATS) which previously served as the Metropolitan Planning Organization (MPO) for the Chicagoland region and the Northeastern Illinois Planning Commission (NIPC) which was the regional planning agency that focused on regional land-use planning in addition to providing the demographic and population forecasts necessary for the CATS transportation modeling process.

In 2002 NIPC embarked on a bold initiative called Common Ground, which was essentially a large-scale public participation process designed to engage the citizenry of this disparate region in envisioning the future.

The Common Ground process culminated in the development of a document called Realizing the Vision: 2040 Regional Framework Plan. The Common Ground process engaged over 4000 participants (residents, community leaders, elected officials) in a workshop process in order to establish a shared vision for the future and a process to achieve those goals. Citizens collaboratively generated 52 goal statements that were organized into five themes: livable communities, diversity of people, healthy natural environments, global competitiveness, and collaborative governance. The sheer scale of this participatory planning endeavor necessitated the extensive use of geo-spatial technologies and e-participation methods. The Common Ground process was designed and developed at NIPC and included innovative new ideas of process by (1) integrating local land-use planning and regional transportation planning; (2) creating many opportunities for small group meetings in many communities across the region, including targeted involvement of youth, minorities, non-English speakers; (3) and returning to the these groups to show them planning analyses at different stages, and conducting focus groups to solicit feedback.

Regional planning work of the sort undertaken through the Common Ground process is often highly technical and voluminous. The obligations of regional planning agencies to integrate land use and transportation planning with the goal of reducing congestion and providing increased mobility requires participants to become proficient in reading and interpreting the language of land use planners, civil engineers, traffic modelers, and economists.

More importantly, participants must become comfortable with the idea of making complex decisions with imperfect information (Stephenson, 1998). Inevitably a credible process becomes an educational process in which experts are involved in providing testimony and advice to non-technical citizens in order that they may make reasonably informed decisions. As a result, the time commitment involved in participating in a regional planning process is far greater than a local project planning effort.

In the Common Ground process, initial work began with developing a shared vision for the future. These participatory visioning exercises consisted of a series of community meetings where groups of participants (ranging from 20 to 100 people) generated goal statements, determined priorities, and developed action steps, using electronic keypad polling. The Common Ground process used Paint the Region, a customized version of a commercially available tool called Index™. The tool was designed to allow individuals with little or no technical knowledge to "paint" land-use preferences and choices in designated areas. Given the technical difficulties (discussed previously), the process was managed by trained technical operators who manipulated the systems taking guidance from citizens. Citizens also generated maps of natural areas and landmarks that were 'sacred' in that they needed to be preserved – in the Chicagoland region, the lakefront, the existing natural preserves, the historical icons, and so on fell into this category. Electronic keypad polling allowed planners to understand tradeoffs that citizens were making to achieve a balance between different plan themes. The combined results were then used to determine population projections and land use changes for 2040.

The Realizing the Vision document is available on the web.[25] It received the American Planning Association's National Plan of the Year award for 2006. The Common Ground process including the innovative use of geo-spatial technologies embedded within it have previously been showcased at the 3rd Public Participation and GIS conference (Craig and Ramasubramanian, 2004) and in other conference venues.

These vignettes provide context to elucidate the evaluation framework which argued that PPGIS implementation can be analyzed in terms of process design, short- and long- term impacts.

PPGIS IMPLEMENTATION AND THE IMPACTS ON PLANNING PRACTICE

Summarizing from the three case studies discussed in the previous section, using the meta-evaluation framework that focuses on process design, short- and long-term outcomes, we can conclude that the introduction of participatory GIS activities gradually foster a more transparent and proactive planning process/practice, the closer they move towards the goals of an ideal participatory planning endeavor. In each of the cases, we can observe that the project leaders paid particular attention to the design of the participatory planning process. In addition, they attempted to build the capacity of the participants to organize, analyze, and discuss planning concepts to the level required by the particular endeavor they were involved; tried to engage participants in every aspect of the planning process, that is, in the framing the project goals, the methods that are selected to examine and investigate these goals, in project implementation, and assessment; and found ways to incorporate participants' views and participant-generated data into formal planning processes; and provided clear and transparent strategies for data generated from the project to be available to the participants.

The design of participatory planning processes is critical because a well-designed process engenders trust (Ramasubramanian, 1999; Witten et al., 2000). Many individuals who participate in community activities get involved because "non-participation" is no

longer an option. Consequently, invitations to get involved in planning initiatives often attract well-established community stakeholders most likely to hold entrenched policy positions. The "vocal minority," as these stakeholders are sometimes derisively called, engage in community decision-making processes in order to further a specific policy agenda, thereby avoiding a consensual approach to plan-making at all costs (Innes and Booher, 2004). The literature on participation emphasizes that an inclusive style which gives the membership a vision of a transformed society, combined with a concrete set of proposals to achieve that vision, makes members more willing to risk alternative modes of behavior (Korten, 1986). In addition, institutional and community-based support systems (e.g., translations or interpretations available for non-native English speakers, provision of day care to facilitate participation of parents, permission to attend planning meetings as part of an individual's paid work time) may be essential to securing the participation of traditionally disenfranchised citizens. However, the timing and poor management of present-day *public comment* processes can sometimes cause even the most well-intentioned citizen to take on an adversarial position vis-à-vis the plan being proposed. The format of public meetings usually restricts citizen involvement to brief comments or prepared statements; inadvertently or deliberately curtailing detailed analyses and discussions. Meetings are held on evenings or weeknights, when the average citizen, particularly one juggling multiple family and work responsibilities is often unable to participate.

In the case of Boston's South End Community Association, many of the problems described above were overcome by establishing a neighborhood planning coalition that was staffed and supported by an individual (SECO's executive director). A core group of participants (staff of neighborhood planning agencies and elected officials) met regularly in the evenings and weekends. These participants viewed coalition meetings as part of their job description, even though meetings occurred during evenings and weekends. They set aside some of their work time to take on SECO coalition activities, because they trusted the credibility of the process, SECO provided the meeting space and staff time. SECO is a situation where professional planners (agency staff who also happened to be community residents) were active and successful on behalf of the more vulnerable residents of their neighborhood who could not have made the time to participate in community meetings. There were many short- and long-term benefits to working with a small coalition of 20–25 members over an extended period of time. The group was able to create a neighborhood "kitchen cabinet" that was able to proactively monitor the development and changes in the neighborhood, rather than reacting to events as and when they unfolded. Their continued presence engendered trust both among other neighborhood residents who did not regularly attend planning meetings and among official planners who were responsible for community outreach. If they lost in terms of broad public involvement (a virtue extolled by PPGIS researchers), they gained in establishing a positive and sustainable neighborhood planning group that remains in place, albeit in a different form even 10 years later.

In the Oak Park Planning Together project, the process was engineered to balance face-to-face meetings with opportunities for communication and feedback. In addition, different types of meeting opportunities were intentionally included to include citizens with different levels of interest and expertise (one-on-one conversations by telephone, email and face-to-face, small group meetings (for 6–10 people) on different evenings and weekends, large group (town hall) meetings (for 50–75 people) to showcase major project milestones, telecasts and web-casts of town hall meetings for those individuals who did not have time to come to meetings, intensive working group meetings with stakeholders (stakeholder groups consisted of 30 appointed members who made a commitment to come to three intensive working

meetings), and planning charettes (over 100 people) where design decisions could be finalized. Separate meetings were held with young people to ensure that youth voices were included in the planning process. In the end, over 600 people had participated in the process over the one year time frame of the project.

So, what happened to the process when the cameras left, when the students and faculty moved on to other projects and lives returned to conventional routines? It is heartening to note that in February 2006, about two years after the Planning Together project concluded, the Village of Oak Park developed Guidelines and Procedures for Participatory Planning that govern the development or redevelopment of any Village-owned land (Village of Oak Park, Board of Trustees Policy, 2006). The guidelines state:

> the purpose of creating the public participatory planning guidelines is to ensure that each village owned property being considered for development/ redevelopment is reviewed in a consistent and open manner....

The guidelines emphasize open communication and the need to raise awareness about planning issues in the Village across a wide swath of the public and the need to provide multiple opportunities for review and comment. The Planning Together process showed elected officials and planning staff that most citizens understood the need to make tradeoffs and were able to balance their interests and commitments to maintaining community character with the needs of growth and economic development.

Even more rewarding is the realization that the Village's current plans for the redevelopment of one of the districts (the Harrison Street Arts District) in Oak Park developed the Lakota Group, a planning consulting firm which incorporates many of the key design and planning recommendations made by the UIC planners. That the UIC team was able to help visualize the design for the district that eventually incorporated into an implementation plan is additional confirmation that the Planning Together process was credible.

NIPC (the land planning agency) merged with CATS (the transportation planning group) soon after the Common Ground process concluded. The success of the Common Ground work is that the commitment to participatory planning survived the agency merger and resulting organizational and staffing changes. CMAP has published their 'Public Participation Plan' as required by federal regulations governing Metropolitan Planning Organizations. CMAP guidelines, developed for northeastern Illinois state:

- the public should have input in decisions about actions that affect their lives;
- public participation includes the promise that the public's contribution will be considered in the decision-making process;
- the public participation process communicates the interests and considers the needs of all participants;
- the public participation process seeks out and facilitates involvement of those potentially affected by local and regional plans;
- the public participation process provides participants with the information they need to participate in a meaningful way;
- the public participation process communicates to participants how their input influenced the decision. (CMAP, Public Participation Plan, 2007)

By emphasizing transparency, open communication, and accountability, these guidelines, as binding policy go a long way in establishing participation within regional planning processes. To a great extent, the success of the Common Ground process has allowed CMAP to be more innovative in preparing their participation plans for the upcoming forecasting challenges.

CONCLUSION

In this chapter I examined three US-based case studies of PPGIS implementation by using a meta-evaluation framework that

emphasized (1) process design; (2) short term outcomes, and (3) long-term impacts. Despite the paucity of comparative evaluations of PPGIS projects in the USA, I have demonstrated that it is feasible and indeed worthwhile to reflectively evaluate PPGIS implementation using a standardized set of criteria. This is a challenging task – PPGIS activities take time, and while we wait for the PPGIS efforts to yield results, people move, memories fade, local political agendas, organizational goals, and community aspirations are likely to shift and sometimes change beyond recognition. Despite these limitations, for the PPGIS field to remain relevant, researchers and practitioners must build in resources for systematic evaluation.

In each of the three case studies discussed, the GIS applications embedded within participatory planning processes allowed for individual and group capacity building (i.e., the tools made it possible for stakeholders to describe their problems and concerns effectively and to learn new ways of viewing their neighborhoods and communities). For instance, the South End community learned that because of the level of education and skills prevalent in their community, the promised hi-tech jobs would be "theoretically" accessible, but practically out of their reach. In Oak Park, stakeholders learned that it was possible to create economic development without destroying community character, and in the CMAP Chicago case, official planners were able to overlay perceptual maps of the region generated by different stakeholder groups to identify activity centers, development corridors, and areas that citizens wanted to protect against over development. Some of this learning was bottom-up (citizens educating official planners), while other aspects of this learning were peer–peer (citizens educating other citizens).

From the project planner's perspective, the impetus for using GIS was different in each of the three case studies – in the case of SECO (Boston), GIS analysis provided rigor and engendered trust to hold the coalition together, generating "what if?" analyses to allow members to create alternative scenarios in a timely manner. In the case of Oak Park, officials sought to energize their public consultation processes to create innovative opportunities for busy citizens to stay involved and engaged in planning without having to physically attend meetings at the Village Hall. In the case of CMAP in Chicago, it was a realization that public consultations of the depth and intensity that were conducted would have been impossible without the use of digital tools such as Paint the Region, developed specifically for the Common Ground project. In each case, the adoption and use of GIS was seen as a way to create a collective community memory, a way to create spatial stories (Ramasubramanian, 2004). In other words, each project, explicitly or implicitly aspired to create a new community of identity (Israel et al., 2005) that would proactively solve problems.

What does this mean for planning practice? In general professional planners are leery of opening up their work to involve the public because they find it difficult to manage public involvement within the orchestrated timeline of complex planning processes. For example, citizens focus on projects, when plans are associated with formulating policies. One of the major contributions of PPGIS work has been to allow participants to shift away from reactive/oppositional approaches to planning to taking on a more proactive stance where different options, simulations, and alternatives can be considered. By doing so, both groups (citizens on the one hand, and official planners on the other) are beginning to appreciate the advantages of consultation. While we have a long way to go, these three case studies suggest that we are gradually moving away from the 1960s style of participation by protest to a more pragmatic style of participation and problem solving.

NOTES

1 For instance, the National Environmental Policy Act (NEPA) enacted in 1969 requires a thorough analysis of the impacts of any project or activity receiving federal funds. By specifically requiring consideration of social, economic, and environmental concerns, the NEPA process allows for external scrutiny. As the NEPA process has evolved, it includes environmental impact assessments, community impact assessments, health impact assessments, and environmental justice analyses. Collectively, these analyses are intended to prevent unwise and uninformed agency actions. Many of these analyses make heavy use of GIS analysis to confirm or disconfirm equity claims and to highlight socioeconomic disparities.

2 FHWA, 2007.

3 Joseph P. Day (1930) 'New York City zoning law makes the skyscraper a thing of beauty', *National Civic Review*, 19(12): 812–14.

4 US Supreme Court (1926) Village of Euclid, *Ohio* v. *Ambler Realty Co*., 272 U.S. 365 (1926). Online resource, available from http://caselaw.lp.findlaw.com/scripts/getcase.pl?court=US&vol=272&invol=365 (last accessed 1 July 2008).

5 US Supreme Court 2005. *Kelo et al*. v *City of New London et al*., No. 04–108. Online resource, available from http://caselaw.lp.findlaw.com/scripts/getcase.pl?court=US&vol=000&invol=04–108 (last accessed 1 July 2008).

6 Interview with practicing planner by author, November 2007.

7 Civic Alliance (2002) *Listening to the City, Report of Proceedings*. New York: Regional Plan Association.

8 Angotti, A. (2007) Plan NYC 2030. *The Gotham Gazette*, February 2007.

9 Obermeyer credits Xavier Lopez, then a student in Orono, Maine with suggesting this term; a fact confirmed by Dr Lopez (2008, pers. comm. with Ramasubramanian).

10 Community development has been defined as a process "designed to create conditions of economic and social progress with the active participation of the whole community and with the fullest possible reliance on the community's initiative" (Rothman, 1974, cf. Levine and Perkins, 1997: 336).

11 The Telecommunications and Information Infrastructure Assistance Program (TIIAP), one of the programs of the National Telecommunications and Information Administration, is authorized by 47 USC.–390–393A (1991) to provide resources to be used for the planning and construction of telecommunications networks for the provision of educational, cultural, health care, public information, public safety, or other social services. It morphed into the Technology Opportunities Program (http://www.ntia.doc.gov/top/, accessed 1 July 2008).

12 East St. Louis Action Research Project (http://www.eslarp.uiuc.edu).

13 Neighborhood Knowledge Los Angeles (http://nkla.ucla.edu) was created in 1998 with a total project cost of over US$1 million with support from multiple sources with over half the support coming from the Technology Opportunities Program of the US Department of Commerce.

14 The London Air Quality Network (http://www.londonair.org.uk/london/asp/default.asp) site allows users to understand the complex phenomena of air pollution monitoring, analysis, and modeling over an extended time frame (1993 to 2007), with data now provided from 33 London boroughs. Users can display, graph, and download data about individual pollution parameters, for particular sites, and compare across sites. Additional information about London's Air Quality Strategy and target pollution reduction goals are also available for easy comparisons.

15 Living Independently in Los Angles (LILA) (http://lila.ucla.edu/) is a regional (county level) approach to addressing the needs of individuals living with disabilities in LA county. LILA includes a map room to assist local resources to create their own database based on their local 'expert' knowledge to identify and map resources that support independent living.

16 Mashups are web-based applications that use data from multiple sources to create a new application to serve a particular purpose (see examples that follow).

17 Chicago Crime Map is a free browsable database of crimes in Chicago, with data gathered from the Chicago Police department and mapped using Google Maps Application Programming Interface (http://www.chicagocrime.org/).

18 The Hiking Trail Database at http://www.trailheadfinder.com/.

HotSpotr, a community driven site that finds wifi hotspots at http://hotspotr.com/wifi.

19 Eg., 2007 Workshop on Volunteered Geographic Information (http://www.ncgia.ucsb.edu/projects/vgi/).

20 Organization and all participants in the SECO project, with the exception of public and elected officials are referred to by pseudonyms as per agreements established when the research was conducted.

21 Raymond Flynn, Mayor, City of Boston.

22 See http://www.oak-park.us/Community_Services/Planning.html for a listing of all plans and studies conducted in Oak Park including the final report of the UIC project "Planning Together: Character Plans for Oak Park Commercial Districts."

23 US PPGIS Conferences http://www.urisa.org/conferences/publicparticipation.

24 24 http://www.nipc.org/2040/ (accessed 1 July 2008).

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