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Dilemmas in Contemporary Planning and State of
the Practice of PPGIS

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Chapter 3
Dilemmas in Contemporary Planning

3.1 The Need for Frameworks

Definitions and frameworks are essential for the progress of systematic inquiry. They create the common ground that is necessary to engage in a meaningful conversation. While definitions can sometimes create intense disagreement and debate, they also help to forge consensus and advance scholarship (Wright et al., 1997). In the last chapter, I reviewed the literature on the evolution of Public Participation GIS (PPGIS) research and practice, commenting on the fact that there is still a lack of agreement about the term. Is PPGIS a set of tools? Is it a way of thinking about doing GIS work in communities? In what ways is PPGIS different from conventional GIS? Can PPGIS include more than GIS, for example, can we discuss it under the umbrella of Public Participation and Information Technologies1 (PP-IT)?

To get us started on this inquiry, let me put forward a working definition that articulates both necessary and sufficient conditions for a particular activity, project, or program to be recognized as a PPGIS initiative. I stated that PPGIS activities are participatory planning initiatives supported by the use of digital technologies. This definition clarifies my world view – that digital technologies must be deployed in the service of a participatory planning agenda, not the other way around. Specifically, I propose that an ideal PPGIS/PPIT activity should:

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 the framing the project goals, 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.

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This definition establishes a set of criteria that must be met by any PPGIS/PP-IT project. In the next section, I discuss how digital technologies are likely to impact and influence participatory planning processes. The discussion that follows is focused on the dynamic of involving people in the decision-making process, although it should be kept in mind, that there are overarching goals (e.g., build a new road, or create new affordable housing) that any planning activity seeks to achieve.

A typical participatory planning process considers:

1. Public Participation Goals
2. Participants
3. Methods of Community Engagement
4. Process Design and Management
5. Digital Tools
6. Data and Information
7. Project Timeline
8. Outcomes and Evaluation

The eight elements anchor my vision of PPGIS-practice and are discussed individually in Sect. 3.2.

3.2 Framework Elements

3.2.1 Participation Goals

In the flurry to discuss the participatory activities that are supported by technologies, many PPGIS researchers do not discuss the goals that drive any planning endeavor. A discussion regarding the goals/purpose of public participation in the United States would be incomplete without consideration of the work of Sherry Arnstein. Her “Ladder of Citizen Participation” (1969) has defined how planners conceptualize citizen participation. Much attention is paid to the Arnstein ladder, an eight rung typology that culminates with citizen power manifested through partnership (citizens “negotiate and engage in trade-offs with traditional power holders”), delegated power, and citizen control (where “have-not citizens obtain the majority of decision-making seats or full managerial power”).

For Arnstein, the main purpose for engaging in a participatory process was to redistribute power – to give voice to those excluded from political and economic processes. Much of her thinking was based on the management of the federal anti-poverty programs, US Department of Housing and Urban Development’s Model Cities program. To the extent that these federal initiatives were largely a product of top-down thinking; a hastily crafted government response to the civil unrest that prevailed at the time, one could argue that her analyses are limited and biased. Although Arnstein herself pointed out the many limitations of the typology, observing that the
rungs of the ladder are simplistic abstractions of a more complex field of individuals, groups, and interests, subsequent scholars have tended to be strongly wedded to the static, unidirectional metaphor of the ladder. Furthermore, Arnstein’s ladder is quite dated (40 years old in 2009) and by framing citizen control of government-led decision making as the only pathway to political power, she ignores the influence and contribution of other influential sectors in shaping American democracy.

Arnstein’s ladder is a useful starting point in the discussion of the purpose of citizen participation. Other writers, including Wiedermann and Femers (1993) have also examined the issue of citizen participation goals, to explain why government agencies engage in citizen participation activities, creating incremental levels of involvement in different aspects of a formal planning process, ranging from education that has little or no impact on decision making to public participation in the final decision-making process.

In their meta-domain matrix that links public and participation, Schlossberg and Shuford (2005, p. 22), draw heavily from the Arnstein ladder and articulate the following goals – information, education, consultation, issue definition, joint planning, consensus, partnership and citizen control. Although Arnstein categorizes information and consultation as tokenism, she points out that “informing citizens of their rights and responsibilities can be an important first step towards legitimate public participation”. Thus if a project/activity is limited to uni-directional information provision, then, it cannot be deemed a participatory planning activity.

The International Association for Public Participation (IAP2) takes a more pragmatic approach, linking the goals of public participation with increasing public impact on decision-making – their spectrum of public involvement goals begins with information sharing, ensuring that it is balanced and objective, and for the purpose of helping participants gain a better understanding of the problems, alternatives, and/or solutions; consultation, in order to obtain public feedback, involvement, to work directly with the public to ensure that public concerns and aspirations are consistently understood and considered, collaboration – acts of partnership in every aspect of the decision-making process, and empowerment – to place the final decision making in the hands of the public (Fig. 3.1).

In my view, the purpose or the overarching goal of any PPGIS endeavor is to enable the development of a critical consciousness “consceintização” (Freire, 1970). Critical consciousness balances active engagement within a problem-solving process with a reflective analysis of the process itself and the resulting outcomes. Because PPGIS implies the use of digital technologies within the participatory planning process, the technologies can be used in creative ways as part of the problem solving process and the reflection process.

Much has been written about critical consciousness, but for the moment, consider that the short term goals of a participatory GIS endeavor are to engage the creative capabilities of the participants in an analysis of their own circumstances, beginning with their experiential knowledge and gradually integrating this knowledge within larger knowledge structures in order to foster a dialogue and a conversation about the most serious concerns expressed by the participants. In community organizing,
### IAP2 Public Participation Spectrum

Developed by the International Association for Public Participation

<table>
<thead>
<tr>
<th>Increasing level of public impact</th>
<th>INFORM</th>
<th>CONSULT</th>
<th>INVOLVE</th>
<th>COLLABORATE</th>
<th>EMPOWER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Participation Goal:</td>
<td>Public Participation Goal:</td>
<td>Public Participation Goal:</td>
<td>Public Participation Goal:</td>
<td>Public Participation Goal:</td>
<td></td>
</tr>
<tr>
<td>To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.</td>
<td>To obtain public feedback on analysis, alternatives and/or decisions.</td>
<td>To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.</td>
<td>To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.</td>
<td>To place final decision-making in the hands of the public.</td>
<td></td>
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<tr>
<td>Promise to the Public:</td>
<td>Promise to the Public:</td>
<td>Promise to the Public:</td>
<td>Promise to the Public:</td>
<td>Promise to the Public:</td>
<td></td>
</tr>
<tr>
<td>We will keep you informed.</td>
<td>We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.</td>
<td>We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.</td>
<td>We will look to you for direct advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.</td>
<td>We will implement what you decide.</td>
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<td>Example techniques to consider:</td>
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<tr>
<td>Fact sheets</td>
<td>Public comment</td>
<td>Public comment</td>
<td>Citizen Advisory Committees</td>
<td>Citizen juries</td>
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</tr>
<tr>
<td>Web Sites</td>
<td>Focus groups</td>
<td>Focus groups</td>
<td>Consensus-building</td>
<td>Ballots</td>
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</tr>
<tr>
<td>Open houses</td>
<td>Surveys</td>
<td>Surveys</td>
<td>Participatory decision-making</td>
<td>Delegated decisions</td>
<td></td>
</tr>
<tr>
<td>Public meetings</td>
<td>Public meetings</td>
<td>Public meetings</td>
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</tbody>
</table>

Fig. 3.1

where Freire’s ideas have found favor, Rivera and Erlich (1992, p. 16) observe that (within the Freirian model):

Organizers and communities [must] view each other as subjects, rather than objects, as learners, and as equals. The process of conscientization may be visualized as a double spiraling helix where both the organizer and the community learn from each other, the problems at hand and the strategies and tactics employed. Both parties become stronger actors because their learning is mutual, supportive, and liberating.

The metaphor of a double spiraling helix, a dynamic process of co-generative learning between initiators of participatory activities and the participants, facilitated
by respectful dialogue is a theme that echoes through communicative action theory (Habermas, 1987), action science (Argyris et al., 1985), and transactive planning (Friedmann, 1992).

Some activist-planners like Angotti (2008) argue that the idea of consensus planning is a myth, and condemn the idea of participatory planning itself – labeling it a smokescreen designed to obscure the real issues. According to Angotti, participation is nothing more than “sitting silently at a public hearing or attending scores of meetings that have no significant role in making decisions that matter” (p. 29). Although he offers us no guidance about how to fix these problems, Angotti’s comments make it clear that we must carefully consider participation methods and techniques, because the instrumentality of participatory planning often shapes our perceptions about the process and influences the outcomes as well.

### 3.2.2 Participants

To state the obvious, participants are central to any participatory planning activity. The academic literature, particularly that literature that emerges from geography has extensively examined the word “public” and the word “participation”, in part because of the original framing of the phrase PPGIS (public + participation + GIS). Schlossberg and Shuford (2005) point out that “for PPGIS, the public can range from every resident in a neighborhood engaged with community asset mapping, to every US citizen interested in viewing census data online”. Based on a review of different framings and conceptualizations of the term “public”, they offer a delineation of the word that includes as categories – decision makers, implementers, affected individuals, interested observers, and random public. They suggest that decision makers constitute a “simple public” in that they are well defined and few in number, making them easy to engage as a group. At the other end of the spectrum, the “random public” are a complex group, because of group size, heterogeneity, and spatially distributed (although this not explicitly stated by the authors). Other scholars like Reitbergen-McCracken and Narayan-Parker (1998) remind us that in the process of categorizing multiple publics, it is essential to identify potential beneficiaries, and those adversely affected, particularly those from vulnerable population groups.

The process of identifying multiple publics is a useful academic exercise and particularly efficient for designers of participatory projects so that they can plan and manage their consultative processes ahead of time. However, this approach may have the unintended consequence of creating “tags” and imply that participants can only play a particular role within a particular participatory project. This cannot be further from the reality – most of us wear many hats – and we don’t necessarily switch roles when we are involved in a participatory process.

Creighton (2005) points out that we’ve used multiple terms to describe participants, including terms like publics, audiences, and stakeholders. Despite its limitations, I prefer the simpler word – participants. In my definition, the public
includes individuals, informal groups, formal organizations, representatives of agencies, volunteers, and others who have chosen to participate in a planning endeavor. Undue emphasis on the term “public” is a distraction from a practical standpoint. It places more emphasis on the efforts of organizers and initiators of participatory planning processes to assemble a diverse group of participants rather than on understanding how the processes are managed, and the outcomes that can eventuate as a result.

In practical terms, a practitioner or an initiator of a PPGIS activity should begin work in their sphere of influence and expand outwards to gradually reach more individuals and groups. The practitioner should be aware that some potential participants (individuals or groups) may not be immediately identifiable and should make every effort to identify and engage them. But, the organizers should always ask themselves – why should a potential participant become involved? What are the barriers that prevent a potential participant form becoming involved? The answer to these questions can be better understood in the discussion that follows.

3.2.3 Methods of Engagement

There is an extremely long list of methods and techniques that can be used to facilitate participatory planning. Many of these techniques are catalogued in The Public Participation Handbook, Creighton (2005). Federal and state agencies have published books and communiqués about best practices in engaging the public. Before the advent of digital technologies, the newspaper was the most important vehicle for information dissemination. Information can be gathered from participants in a variety of ways – from coffee klatsches, individual interviews, focus groups, and public hearings. In rural areas, rapid rural appraisal (RRA) and its more progressive counterpart, participatory rural appraisal (PRA) have been adopted to solicit and manage community responses. It’s important to remember that the most successful community engagement techniques are customized to the particular situation and congruent with the cultural values and mores of the participant group.

In the United States, formal methods of public engagement are severely restricted, in part for legal reasons. Agencies cannot actively involve the participation of vulnerable populations4 (e.g., youth, elderly, intellectually challenged, individuals receiving federal assistance) without following stringent protocols that govern engagement. Many of these laws were put in place to protect these population groups, but they have had the unintended consequence of formalizing and restricting engagement. Innes and Booher (2004) note a similar problem with open records and open meetings laws instituted in the United States to ensure participatory democracy. Open meeting laws, for example, require officials to publish meeting agendas ahead of time and not deviate from them. In their efforts to pay attention to due process, many agencies use Robert’s Rules of Order (parliamentary procedure) to enforce order to the proceedings. Consequently many public meeting
discussions are stilted and do not allow for the spontaneity that one would typically expect from a free-flowing discussion.

Architects and urban designers use a variety of visual techniques to solicit information and ideas from participants, although these are usually restricted to small groups. The work of architects is relevant in part because they use non-verbal techniques to communicate ideas. For example, The Center for Understanding the Built Environment (CUBE)^5 created a curriculum and materials to create “Box City”. The materials allow children and adults to learn city planning principles, including creating opportunities for participants to talk about the future in a non-threatening environment.

Architects also rely on an intensive community engagement technique called a *charrette*.^6 The charrette is a consensus building strategy, usually conducted over 3–7 days, and can involve a large number of people who participate in different ways over the period of time when the charrette is conducted. The charrette is usually successful only when there is convergence around problem identification and when solutions are being discussed (Lennertz & Lutzenhiser, 2006). The charrette’s solution strategies tend to focus on physical interventions (sometimes called place-making). The Oak Park project and the Common Ground Project discussed as case studies in Chaps. 6 and 7 explore how charrettes can be adapted and expanded to integrate digital tools.

As digital technologies have become prevalent, they are being used to enhance conventional methods of community engagement. Now, faxes and email blasts are used to remind participants to attend meetings. Agencies and groups use RSS feeds^7 to remind subscribers about events and meetings of interest in a particular neighborhood or about a particular issue. Agencies use conventional mail surveys, phone interviews, and electronic surveys to solicit information and feedback about a variety of issues from the general public. These surveys are also disseminated in different languages. Agencies also use special methods (targeted outreach) to hear from disadvantaged population groups – most agencies have a designated public outreach coordinator, whose job it is to identify potential stakeholder groups and devise ways to reach them.

I propose that the following ten questions must be addressed in the process of selecting a particular community engagement method or group of technique.

1. Does the method of engagement identify overarching goals (the purpose of community engagement) explicitly to the participants?
2. Does the method of engagement outline a sequence of steps including intermediate milestones that must be achieved in the pursuit of overarching goals?
3. Does the method of engagement facilitate interactive communication and dialogue?
4. Does the method of engagement allow for participation of people without formal education or professional expertise?
5. Does the method of engagement allow for meaningful participation by vulnerable populations – young, old, frail, visually impaired, physically or intellectually challenged?
6. Does the method of engagement allow for the inclusion of graphical (non-textual) communication?
7. Does the method of engagement acknowledge the dominant realities (e.g., physical, social, political, cultural, and financial realities) of the participants?
8. Does the method of engagement offer participants new skills or strategies to describe the world around them?
9. Does the method of engagement foster discussion, analysis, and problem solving in teams/small groups?
10. Does the method of engagement provide learning pathways so that participants seeking additional information or insight have the ways and means to acquire it?

The answers to these questions will establish a clear link between the goals of public engagement with methods and techniques and provide structure and form, i.e., inform process design and management.

### 3.2.4 Process Design and Management

Public involvement experts will tell you the same thing that the text books tell you – preparation matters! In fact, it matters a great deal because it often determines the success or failure of a participatory planning initiative. The core team (members responsible for designing and implementing a participatory endeavor) must facilitate community input into the design of the process as early as feasible. Necessarily, these conversations will begin with community leaders and/or those previously involved in such activities. However, it must quickly expand to include a range of individual and institutional actors that are already active in that project context.

Process design requires the core team to plan the management of the field implementation. In thinking through and answering mundane questions such as: how many meetings, who’s going to lead the meeting, what’s the meeting format, where is the meeting going to be held, the core team is actually making significant decisions about the quality of the interactions and the outcomes that can result.

Typically, a participatory planning process must balance the need for large group meetings that focus on establishing community-wide agendas and visions with more intimate meeting formats that are suitable for detailed interactions about specific problems and issues. Both types of meeting formats must incorporate opportunities for interactive communication and feedback. In addition, a good process must provide points of entry for participants with different levels of interest and expertise to get involved. A good process must document and showcase major project milestones to ensure that those individuals, who did not have the opportunity to come to meetings can be informed. Much creative planning work actually takes place in intensive working group meetings with stakeholders. Thus a good process will pay particular attention to the process by which stakeholders are selected and invited to participate.
Process design must consider issues of staffing, including articulate spokespeople, technical (issue) experts, community (context) experts, meeting facilitators, graphics and visual communication specialists, writers, database/data managers, logistics coordinators, and individuals proficient in the use of print and digital media for mass communication. Staffing is directly related to resources and resource allocation. Good preparation will actively link available resources to ensure that all project activities are designed, implemented, and documented carefully. To state the obvious, it’s better to do a few participatory activities and do them well.

Lastly, participatory process design and management is a craft. The core team members require practice and skills in addition to a deep enduring commitment to the spirit of participation. The day-to-day work of implementing a participatory planning process is extremely demanding; in particular, it requires the surrender of personal egos in order to achieve project goals.

### 3.2.5 Digital Tools

There are a wide range of digital tools\(^8\) that can be used to support different aspects of participatory planning – some tools assist with the management of participatory processes discussed earlier. For example, participatory planning projects may benefit from the use of good content management systems\(^9\) to archive and catalog data and information and help make them accessible to a wide variety of users.

In terms of using digital tools to facilitate community engagement, I propose that practitioners organize them into the following meta-categories after Mitchell (1999). In his discussion of communication alternatives and the consequences of the digital revolution, Mitchell (1999) proposed a simple \(2 \times 2\) matrix to demonstrate how digital technologies can be adapted and integrated into day-to-day communication activities, considering that activities could be organized into synchronous or asynchronous modes of communication.

Following this logic, we can identify digital tools that facilitate communication in four ways:

(i) Physical place/synchronous mode (e.g., the use of digital tools like keypad polling in a community meeting);

(ii) Physical place/asynchronous mode (e.g., the use of a digital smart board that is placed in a community center allowing different individuals to review and make comments about a redevelopment plan using electronic “sticky notes”);

(iii) Virtual place/synchronous mode (an online meeting where spatially disconnected participants view, listen, and respond to a single live presentation streamed via the web and participate in a discussion with attendees electronically in real time); and,

(iv) Virtual place/asynchronous mode (where individuals or groups are able to download customized content related to a project/plan to review at their own pace using their own computers/software).
In addition to this meta-categorization, the adoption of digital tools must be linked with the goals of participation, the methods of engagement, and the existing skills/resources available among the participants. If digital tools cannot be directly applied, then, the products that are generated from these tools can be used in more traditional ways – for example, printing a copy of a GIS-generated map and using paper copies for discussion at a community meeting.

GIS tools can be directly or indirectly deployed in all four modes of communication, although much of the PPGIS narratives and case studies are about the use of GIS tools in quadrant 1 (same place – same time). The benefits and constraints of using these tools in small group settings has been extensively discussed in the literature and are briefly summarized in Sect. 2.3.

A plethora of tools are now available to facilitate the creation of realistic 3D representations (e.g., building photos) and dynamic scenes (e.g., realistic simulations of traffic or pedestrian flows through recognizable urban settings). These tools can be linked to conventional GIS map representations in order to further ease communication with naïve users.

Finally, there are a set of complex digital tools are better described as planning/decision support systems (PSS/DSS) (Brail & Klosterman, 2001). Planning support systems are generally cost-intensive assemblages that link the power of analytical models, the mapping and analysis capabilities of GIS, and the visual power of digital simulations. The most interesting developments in digitally enabled public participation are likely to emerge from the deployment of these systems (not tools) and they bear further investigation.

With ingenuity and some technical expertise, it is possible to create ad-hoc assemblages of tools and techniques as an alternative to the do-it-all planning support systems such as MetroQuest. It is possible to use free software to complete a range of common community engagement tasks, at least in the context of the United States, where data is widely available, and access to a personal computer and a cell phone are relatively wide spread. This leads us to consider the next element of the framework – data.

### 3.2.6 Data and Information

In the United States, much of the publically available data to examine urban issues, particularly data about socio-economic disparities comes from the Census Bureau. Over the years, many need-based programs or policies that investigate socio-economic disparities have used census data. Presently, socio-economic data is collected and assembled by a variety of governmental and non-governmental entities including research organizations, community groups, universities, and political parties.

The United States has made much of its geo-spatial data accessible to the public via a web portal [www.geodata.gov](http://www.geodata.gov), a one stop location with links to federal, state, and local geographic data. Data categories include administrative boundaries, atmosphere, business, demographics, health, transportation, and utilities to mention
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a few. Private entities like ESRI support a global network of geographic information users and data providers (www.geographynetwork.com).

In the United States, the focus is the availability of reliable micro-neighborhood data that creates meaningful data for local community-based problem solving. It is at this level of analysis that data disparities become apparent and consequential. For example, advocates for the homeless in large urban areas like New York City have to conduct a separate count to estimate the population of homeless individuals living on the streets. The Homeless Outreach Population Estimate (the HOPE count) is usually made possible with the help of concentrated volunteer efforts over a single night during the coldest months of the year. For smaller cities, these types of counts may be impossible to conduct on a systematic basis.

In recent years, advances in cell phone technology are being used to gather volunteered geographic information (VGI). These systems allow individuals to immediately record a wide variety of geo-tagged information and send it to a central location. In New York, the 311 system has enabled callers to upload images, videos and sound so that information and evidence that is often transitory (noise pollution or littering) can be documented (Rivera, 2007) although the data is only made available to the public at a highly aggregated scale. The aggregation avoids concerns about privacy and the fear of surveillance, but places limits on micro-neighborhood organizing efforts.

For conducting participatory planning efforts, the focus should be on data assembled by participants and reflect their needs and interests. Mike Barndt (2002) reminds us that the data collected should be “appropriate” to serve community needs. While the term appropriate is ill-defined, assembled data must be reliable (credible) in order to be useful to serve community needs. In many instances, the credibility of the data is associated with the individual or organization that creates and assembles the data for community use. While some advance planning can be done in assembling readily available socio-demographic data, much of the innovation will require new data collection that will take time.

References to data often focus on quantitative data. In participatory planning work, much of the community generated data is in the form of pictures, maps, drawings, check-lists, and sometimes verbal narratives. This data must be carefully compiled and archived so that it can be appropriately integrated in decision making.

3.2.7 Time

Participatory planning and capacity building processes as conceptualized in the beginning of this chapter takes time. In part, it takes time for a core planning team to get involved with community activities and not be regarded as complete outsiders. It is that investment of time that creates a sense of trust because people in marginalized communities often associate time commitment as a proxy for commitment to a particular socio-political cause, or to the community itself (Korten, 1986). The time that it takes for projects to be launched and implemented can take months, sometimes years. Archiving this process, along with milestones that record successes and
failures is an important element of process design and management discussed earlier in this chapter.

Time must be closely correlated to project goals and the reasons for engaging in a participatory process, rather than the timelines imposed by external institutions such as funding agencies or universities. Insofar as one person cannot be expected to be available for project management through an extended time period, creating a distributed management structure that includes more than one project manager may be a necessary staffing strategy to ensure continuity.

### 3.2.8 Outcomes

I earlier argued that the overarching goal to create a participatory initiative is to enable the development of critical consciousness among participants. What is critical consciousness? Or in other words, how do participants who’ve become critical thinkers behave? This element is more extensively discussed in upcoming chapters (Chaps. 8 and 9) because it is so central to the issues we’ve raised thus far.

In brief, however, outcome can be thought of as short term gains and long term results. Distinguishing between short and long term is dependent on the situational context. In general, short term gains are measured at the end of the project period while long term gains are measured with an eye towards sustainability – the 3–5 year time period after a participatory initiative has formally concluded.

Another way to measure outcomes is by reflecting on the attitudes of participants: If:

- the social, intellectual, and political capacity of the participants has improved;
- the participants become more articulate and effective advocates for their own and the community’s interests;
- participants are more aware of the intricacies of urban governance and are better equipped to participate within these systems;
- there is increased community cohesion;
- there is willingness to participate, because there is increased trust in participatory processes and their outcomes; then, and only then can we confidently say that the investments of the participatory process have borne fruit.

Considering the linkages between goals and outcomes requires us to explore the similarities and differences between Citizen Science and PPGIS.

### 3.3 Citizen Science and PPGIS

Citizen science\textsuperscript{15} describes the work of ordinary citizens who, while engaged in the pursuit of their own hobbies and interests make meaningful contributions to the work of scientists and researchers. However, this is not as simple as it sounds. A long
standing and vigorous debate persist between those scholars and researchers who are typically concerned with establishing and maintaining scientific rigor while others argue that science and scientific research should shake off its claims of neutrality and objectivity and engage more actively in solving immediate and pressing problems. Donald Schön described these tensions from the point of view of a practitioner thus:

This dilemma of rigor or relevance arises more acutely in some areas of practice than in others. In the varied topography of professional practice, there is the high, hard ground where practitioners can make effective use of research-based theory and technique, and there is the swampy lowland where situations are confusing “messes” incapable of technical solution. The difficulty is that the problems of the high ground, however great their technical interest, are often relatively unimportant to clients or to the larger society, while in the swamp are the problems of greatest human concern. Shall the practitioner stay on the high, hard ground where he can practice rigorously, as he understands rigor, but where he is constrained to deal with the problems of relatively little social importance? Or shall he descend to the swamp where he can engage the most important and challenging problems if he’s willing to forsake technical rigor? (Schön, 1983, p. 42).

Some researchers and scientists are unwilling or unable to work with non-scientists, either because of their own ideological biases preclude this option or because their research requires a high level of technical proficiency requiring skills not usually found among the general public. In recent years, researchers working to understand diverse natural or biological phenomena such as avian behavior, climate change, weather patterns, and spread of infectious diseases appear to benefit from working with non-experts who are simply interested in appreciating the phenomena as a hobby or encounter these phenomena as part of their day-to-day routines. For example, the Cornell University Lab of Ornithology has a number of citizen science programs to collect data about bird populations, migration, nesting, breeding, and mating patterns of birds. In its most limited conceptualization, citizen science is about generating a reliable data stream for researchers.

Members of the public who get involved in these “scientific” activities can expand their own awareness and understanding about scientific issues. They are also likely to experience a sense of fulfillment/accomplishment because of their contributions to greater scientific and social goals. In addition, participants may gain access to new opportunities and experiences that benefit their own personal or professional growth.

Policymakers concerned about emerging threats consider citizen science methodologies promising in their efforts to cope with environmental and security threats. Citizen science approaches speed up information flow because observers can communicate information directly to researchers who can make sense of the data in a timely manner. The comparative advantage of engaging many individuals in the service of one goal can be summed up with two words, economy and efficiency. Concerns about accuracy and reliability do exist, but researchers engaged in citizen science work argue that providing training and guidance to participants already enthusiastic about the subject matter and committed to the scientific enterprise can overcome these obstacles.
The Open Street Map is an example of a citizen science project that uses open source GIS tools and protocols to create a free, editable map of the world. The project has an affiliation with University College, London.

Planners working in poor communities have long emphasized the need to learn from the experience of the locals, and engage them in the development of planning and design solutions. Likewise, since the early days when community-focused GIS work began, researchers engaged participants in data collection efforts. Historically, there were many reasons for this; the most obvious reason was the recognition by the researchers and research team that the local experience and expertise of community members was critical to the data gathering effort. Another reason was the lack of resources. Projects operating on limited or non-existent budgets relied on assistance and support from the community.

Citizen science projects have many similarities with participatory planning efforts that use GIS and other digital tools. Both approaches harness the capabilities of ordinary people to help solve problems. However, the majority of citizen science projects seem to focus on moving data, information and knowledge upstream – to researchers and policymakers while it is not clear how participation in these activities will provide immediate benefits to the participant beyond the self-satisfaction one gains from making a useful contribution to a larger societal goal.

Let us take a closer look at Park Scan, a citizen science project launched in San Francisco and now being expanded to other cities. According to its creators, ParkScan is a “community-initiated, web-based reporting system that tracks maintenance conditions in San Francisco’s parks and playgrounds. ParkScan has been helping to improve neighborhood parks and playgrounds since 2003”. Using this web-based mapping tool, citizens and visitors can report on the physical and environmental conditions/characteristics of the city’s parks. The project was developed by a San Francisco-based park advocacy group with the support of the city and is funded by two private foundations.

ParkScan has many positive attributes. Anyone can serve as an additional pair of eyes and ears to support the city’s efforts to keep up its parks. In a time of tight budgets, the city staff probably finds it difficult to monitor all of the city’s parks. At the same time, record keeping and monitoring help to measure progress and argue for additional resources. The data can be parsed to create different types of reports, e.g., reports that focus on particular issues (graffiti), park features or elements (trees or benches), according to political jurisdictions (districts), or according to the time taken to resolve complaints.

Yet, the entire effort seems to be focused on “helping” the city do its job better. Would it not be more useful to engage citizens in building a sense of community among park users? Would it not be more useful to encourage citizens to focus on programming activities in the parks? Perhaps the ParkScan website could be expanded to allow individual respondents to be able to speak and communicate with each other, rather than with the central office that receives and addresses their complaints. And, finally, we have to ask, where is the science in this effort – what scientific problem is being solved by using the time and efforts of volunteers?
3.4 Overview of Upcoming Chapters

The definition and the framework described extensively in Sect. 3.2 are based on a review of literature in many fields. The framework will be used to evaluate three case studies in upcoming Chaps. 5, 6, and 7. Before we move on to the case studies, I present to you, the results of a national survey of PP-GIS activities, conducted in 2008 in order to specifically focus on the complexities of doing participatory GIS work in the United States. Although the central argument of the book is that GIS activities are melding and merging with other digital technologies, the participants in the survey reflect a sizable community of users who are focused on what can be considered conventional GIS activities. Their experiences are of particular interest because they add an additional layer in framing the organizational contexts within which this work takes place.

Notes

1. CITIDEP (a research center on information technologies and participatory democracy) with headquarters in Lisbon, Portugal, runs several international conferences, including the 1st International Conference on Public Participation and Information Technologies Conference (ICPPIT99) held in Lisbon in 1999 followed up by a 2nd conference, ICPPTI03, held at MIT in 2003. Additional information about these conferences can be found at: www.citidep.pt
2. It is somewhat ironic that these authors are so keen to focus on “US citizens” when attempting to answer the question, “who is the public?” in discussions about PPGIS. Since when do you have to be a citizen of one country to be able to sample that country’s census data, and if so, why should it be the case?
4. Generally, these rules govern actions of government agencies that receive federal funding or universities. In a university context, these rules are enforced by the university’s Institutional Review Board (IRB). Additional details about the IRB can be found at: www.hunter.cuny.edu/irb
5. Center for the Understanding the Built Environment http://www.cubekc.org/index.html
6. Lennertz and Lutzenhiser (2006) define a charrette as a multiple-day collaborative design and planning workshop held on-site and inclusive of all affected stakeholders.
7. RSS (Really Simple Syndication) feeds allows users with internet enabled devices to subscribe to content updates – typically, these updates refer to changes made to a website or a blog, but it can also be used to gather information about meetings and/or events related to particular topics.
8. The list of tools that can be used for facilitating participation grows every day. For this reason, it would be impossible to provide a list of tools, because it would become outdated very quickly.
9. Rhiza Labs has developed a proprietary tool called Catalog that helps end users explore, visualize, and analyze information from multiple sources. Learn more at: http://www.rhizalabs.com/products/catalog/overview/
10. Adobe’s PhotoShop is a popular software program that allows photo editing and manipulation to create before-and-after scenes of urban environments. http://www.adobe.com/products/photoshop/family/
11. CommunityViz, Site Builder, Model Builder, Scenario 360 and Scenario 3D are all tools developed and distributed by Placeways, LLC (www.placeways.com).
12. MetroQuest is a proprietary set of tools that can be customized to support planning processes. Additional details available at www.metroquest.com

13. Google offers a variety of free services including Gmail (email), Google Groups (for creating mailing lists and discussion groups), SketchUp (3D renderings), GoogleDocs (ability to collaboratively write/edit/share documents, spreadsheets, and presentations), Blogger (a tool to develop and publish blogs), and Picasa (a tool to find and share photos).

14. With apologies to Rudyard Kipling.

15. Altan Irwin, in his 1995 book, *Citizen Science: A study of people, expertise, and sustainable development*. London: Routledge states that he chose the title Citizen Science because it was “pleasingly alliterative”. He proposes that citizen science is a science that addresses the needs and concerns of citizens, one that is developed and enacted by citizens themselves. Thus, citizen science can also be about knowledge that is created outside of formal academic institutions and imbued with local, experiential evidence. Irwin does not privilege the knowledge created by citizen science over formal science.


17. Cornell Ornithology Lab Citizen Science Projects http://www.birds.cornell.edu/netcommunity/citsci/projects


20. Park Scan http://www.parksan.org
4.1 Introduction

I have previously observed that public involvement in planning is determined by particular social, political, and cultural contexts. Similarly, GIS adoption and implementation in planning is also influenced by a wide variety of contextual factors such as the attitudes of key decision makers towards the new technologies, availability of skilled personnel, and resource constraints (e.g., Masser & Onsrud, 1993; Campbell & Masser, 1995; Huxhold & Levinsohn, 1995; Obermeyer & Pinto, 2008). Even inter-departmental rivalries can influence how GIS adoption progresses within an organization (e.g., Kraemer et al., 1989).

Researchers use different strategies to examine these contextual variables and draw conclusions about their impacts and influence on the decision-making process. One such strategy is to use survey data to reflect on the state of the practice. Survey research has both advantages and limitations. Surveys, particularly those surveys distributed through the internet can reach large populations with relative ease. In this chapter, I will discuss the results of a national survey that I conducted in 2007–2008. The results provide a snapshot of the ways in which spatial technologies are currently being used to support and facilitate public participation. This survey effort builds upon earlier attempts to better understand PPGIS activities in the United States which are discussed briefly below.

4.2 The Sawicki/Peterman Survey (1996–1998)

In 1998, Sawicki and Peterman embarked on an ambitious project— to produce a comprehensive inventory of PPGIS activities in the United States. Their work was informed by Craig’s earlier analyses of the activities of non-profit data providers who were working to make public data accessible to community groups. Sawicki and Peterman quickly realized that the PPGIS field was growing rapidly and that there was little or no clarity about what constituted a PPGIS activity. At the same time, many individuals and organizations were avidly exploring the
capabilities of GI technologies in order to adapt these tools for use in community settings.

Sawicki’s team cast a wide net to identify PPGIS groups, eventually identifying 65 organizations spread across 40 cities that were involved in some type of community-oriented GIS activity. This list included a wide range of nonprofits (30 organizations), some affiliated with universities, as well as some government agencies were engaged in some kind of PPGIS activity. The eighteen 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 (ESLARP), and Neighborhood Knowledge Los Angeles (NKLA).

One of the salient features of this survey is that it gets to one of the key issues embedded within the PPGIS framework I described in Chap. 2 – namely, the role of data and information. For in fact, the Sawicki/Peterman survey is really an inventory of data providers and data intermediaries; in the authors’ words, “our goal is to assemble an inventory of organizations that contribute to public participation in community decision-making by providing local-area data to community groups” (p. 24). Other than an academic curiosity to understand the extent/spread of these activities, the researchers sought to draw some conclusions about the relationships between increased access to local-area data (i.e., sub-city/neighborhood level data) and community empowerment.

One of the more tangible findings from the survey was a confirmation that access to new data (particularly sensitive data, such as data about bank lending practices made available through the passage of the Home Mortgage Disclosure Act of 1975), coupled with GIS mapping capabilities did allow community groups to establish new ways of challenging systemic social barriers, as discussed in Chap. 1. This is an important finding. However, activists like Gale Cincotta were quick to point out that the legislation such as the Community Reinvestment Act were also essential to formalize and consolidate these gains, a point reinforced in the case study in Chap. 5.

At the same time, a close reading of the analyses provided by the authors suggests that community-based organizations may have been ambivalent about the value of data and information. The authors found that some community groups did not really want to integrate generalized demographic data and information in their day-to-day decision making. From an organization’s perspective, information about property ownership was considered interesting, perhaps because of its potential to create an organizing campaign against absentee landlords, but census data about neighborhood characteristics was not considered particularly relevant. From the discussion of the survey, one can conclude that many community-based organizations are likely to use data and simple spatial analyses to articulate the need for their continued existence to funding agencies, than to use data for the pursuit of community empowerment.

The Sawicki/Peterman survey served as an excellent starting point for my research, although, I was very cognizant that the field had changed rapidly in the intervening years.
The main focus of the 2008 PPGIS survey was to provide an updated understanding of the range of organizations that were engaged in PPGIS activity in the United States. The survey consisted of three major components:

– a web search to identify a wide range of community-integrated GIS activities that could potentially be classified as PPGIS activity;
– a short electronic survey that was widely disseminated through professional and associational networks;
– a follow up telephone call/conversational interview with survey respondents who had indicated their availability and willingness to be interviewed.

4.3 Web Search

Like Sawicki and Peterman, I found that the definitional problem was a huge barrier in attempting to create an inventory of PPGIS activities. The web search identified a wide range of private, nonprofit, and government groups that were engaged in activities that are commonly associated with PPGIS work. These included unique commercial mapping sites, grassroots community organizations, on-line public agency data and mapping portals and university-community outreach centers.

In my attempt to organize the inventory, I reviewed earlier attempts at creating typologies. Leitner et al. (2002) had identified six ways in which GIS tools were being made available to community groups. These approaches included: (i) community-based (in house) GIS, based within a well-established community organization; (ii) university-community partnerships (limited engagement to achieve particular programmatic or project goals, such as engaging a GIS class in data collection/analysis activities at the behest of a particular community); (iii) GIS availability in public locations (e.g., in public libraries); (iv) Map rooms (a facility owned and managed by a city agency to generate customized maps to serve community needs); (v) Internet Map Servers (web portals that allow users to create and download maps and data via the Internet); and (vi) Neighborhood GIS centers (specialized community-based organizations that are focused on providing customized maps and analyses for community groups).

This typology was an excellent starting point to understand the different ways in which PPGIS activities can be supported. Yet, the Leitner typology does not include the various ways in which the private sector provides useful and relevant information to individuals and communities. In many instances, private developers of web services are pioneering citizen science projects discussed in the previous chapter. These portals allow citizens to add their own perspectives on the data they use and return it back to the wider community. In addition, the Leitner typology (because of when it was devised, in the late 1990s/early 2000s) does not fully incorporate the dramatic shift to web-based delivery of data and information by both private and public entities.
The results of the web search (see Table 4.1) were used to create a four part categorization that addresses the role played by the organizations. This simpler typology integrates the Leitner typology and the data intermediary typology (government agencies; university centers; quasi-autonomous non-governmental organizations; and non-profit organizations) devised by Sawicki/Peterman.

4.3.1 Community-Based PPGIS Facilitators

In this category are organizations that work directly with citizens to educate them about how to use geospatial data for the express purpose of improving their community. One such example is the work of the Recovery Action Learning Laboratory (RALLY), based in New Orleans. The group that originally formed to assist with recovery efforts in post-Katrina New Orleans, has since focused on primary data collection, monitoring, and evaluation. The group uses the information to build local neighborhood capacity and initiate advocacy efforts. RALLY’s work is supported through foundation grants and private donations.

4.3.2 University-Based PPGIS Facilitators

Both Sawicki/Peterman and Leitner et al. implicitly acknowledge the powerful role played by universities in providing intellectual and technical support, infrastructure and staff support to establish and sustain PPGIS projects. Many of these partnerships do not directly engage citizens in data collection and analysis. Rather, universities partner with local community groups that organize and redistribute the data or map products to community groups who request their services. The CUNY Mapping Service of the City University of New York assists a wide variety of groups in the design and development of community-oriented GIS activities, and produces maps and data for special projects on an as-needed basis. The service also supports the Open Accessible Space Information System (OASIS) by maintaining a robust data inventory of open space and facilitating the creation of user-defined maps. Other examples of these partnerships include the London Air Quality Network and Living Independently in Los Angeles.

4.3.3 Data Providers

Data providers simply share a good amount of geospatial data with the general public. These providers can be community-based physical locations (e.g., the Data center in Milwaukee), or in virtual locations (e.g., dataplace.org) or exist in both real and virtual worlds.
<table>
<thead>
<tr>
<th>Application</th>
<th>URL</th>
<th>Category</th>
<th>Level</th>
<th>Features</th>
<th>How participatory?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Slaithaite</td>
<td><a href="http://www.ppgis.manchester.ac.uk/projects/slaithwaite">http://www.ppgis.manchester.ac.uk/projects/slaithwaite</a></td>
<td>Land use planning</td>
<td>Beginner (Beg)</td>
<td>Citizens comment on a particular road, site, building, etc.</td>
<td>High: allows for comments</td>
</tr>
<tr>
<td>London Air Quality</td>
<td><a href="http://www.londonair.org/uk/asp/virtualmaps.asp">http://www.londonair.org/uk/asp/virtualmaps.asp</a></td>
<td>Environmental</td>
<td>Advanced (Adv)</td>
<td>Create maps showing actual and future pollution conditions; data available for download</td>
<td>Mid: informs only; but good data for spatial decisionmaking</td>
</tr>
<tr>
<td>Walk Score</td>
<td><a href="http://www.walkscore.com">http://www.walkscore.com</a></td>
<td>Residential</td>
<td>Beg</td>
<td>Enter address, shows walkability &quot;score&quot; of your neighborhood and nearby goods / services</td>
<td>Low - informs only; little &quot;hard&quot; data for spatial decisionmaking</td>
</tr>
<tr>
<td>Chicago Crime Map</td>
<td><a href="http://www.chicagocrime.org/map">http://www.chicagocrime.org/map</a></td>
<td>Crime</td>
<td>Beg / Intermediate (Int)</td>
<td>Google base map, query crimes by location, time, etc.</td>
<td>Mid: informs only; but good data for spatial decisionmaking</td>
</tr>
<tr>
<td>Chicago Police CLEARmap</td>
<td><a href="http://gis.chicagopolice.org">http://gis.chicagopolice.org</a></td>
<td>Crime</td>
<td>Int / Adv</td>
<td>Advanced GIS interface allows for creation of maps, tables, etc.</td>
<td>Mid: informs only; but good data for spatial decisionmaking</td>
</tr>
<tr>
<td>Open Street Map</td>
<td><a href="http://www.openstreetmap.org">http://www.openstreetmap.org</a></td>
<td>Cartography</td>
<td>Int / Adv</td>
<td>Free, unrestricted base map; user adds his own spatial data</td>
<td>High: public map creation; but requires skill</td>
</tr>
<tr>
<td>Primo Spot</td>
<td><a href="http://www.primospot.com">http://www.primospot.com</a></td>
<td>Residential</td>
<td>Beg</td>
<td>Shows on-street parking availability for a given address; uses Google base map and interface</td>
<td>Mid: informs only; but user can suggest corrections</td>
</tr>
<tr>
<td>NYPRIG CMAP</td>
<td><a href="http://cmap.nyprig.org">http://cmap.nyprig.org</a></td>
<td>Partnership</td>
<td>N/A</td>
<td>Nonprofits partner with CMAP to produce maps to aid in their spatial decisionmaking and/or advocacy</td>
<td>Mid: GIS work is done by the expert (CMAP); but the nonprofits are getting a product to aid them</td>
</tr>
<tr>
<td>Application</td>
<td>URL</td>
<td>Category / partnership</td>
<td>Level</td>
<td>Features</td>
<td>How participatory?</td>
</tr>
<tr>
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<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>NYC OASIS</td>
<td><a href="http://www.oasis.nyc.net">http://www.oasis.nyc.net</a></td>
<td>Partnership / comprehensive map</td>
<td>Beg / Int</td>
<td>Comprehensive city map; users can select a host of themes to create their own map</td>
<td>Mid: while map is simple; navigating and understanding the different layers requires skill and knowledge</td>
</tr>
<tr>
<td>Minneapolis Neighborhood Information System</td>
<td><a href="http://www.cura.smn.edu/MNIS.php">http://www.cura.smn.edu/MNIS.php</a></td>
<td>Partnership</td>
<td>N/A</td>
<td>Similar to CMAP. Community Groups partner with MNIS, which is a university consortium, to receive GIS training.</td>
<td>High: appears that groups work with MNIS to learn GIS, not just a mapping service</td>
</tr>
<tr>
<td>Farmland Preservation and GIS</td>
<td><a href="http://www.lic.wisc.edu/shapingdane/agriculture/options/bulletin.htm">http://www.lic.wisc.edu/shapingdane/agriculture/options/bulletin.htm</a></td>
<td>Partnership / service</td>
<td>Adv</td>
<td>University of Wisconsin researchers used public input to determine community concerns (farming), then created a GIS to designate Farmland priority zones</td>
<td>Low: participatory only at first stage in seeking community input; skilled researchers did the analysis</td>
</tr>
<tr>
<td>Portland, OR Metro Government / City of Portland</td>
<td><a href="http://www.metro-region.org/article.cfm?ArticleID=737">http://www.metro-region.org/article.cfm?ArticleID=737</a></td>
<td>Partnership / service</td>
<td>N/A</td>
<td>Metro offers a range of GIS services and analysis (at a cost) for concerned citizens and groups. City of Portland maintains an impressive, web-based GIS mapping service.</td>
<td>Mid: impressive range of data presented, but to use offline requires an expensive partnership with the city or Metro</td>
</tr>
<tr>
<td>MetroQuest Software / GuelphQuest</td>
<td><a href="http://guelph.ca/living.cfm?subCatID=1615&amp;subCatID=2193">http://guelph.ca/living.cfm?subCatID=1615&amp;subCatID=2193</a></td>
<td>Visioning software</td>
<td>Beg</td>
<td>Residents log onto city website and answer questions regarding their preferred growth patterns. Virtual scenario (i.e. map) is presented showing the effects of their choices.</td>
<td>Mid: users are entering predefined responses and seeing their results; not clear what decisionmakers are doing with this information</td>
</tr>
<tr>
<td>Neighborhood Knowledge California (NKCA)</td>
<td><a href="http://nkca.ucla.edu/">http://nkca.ucla.edu/</a></td>
<td>Partnership / community mapping service</td>
<td>Beg / Int</td>
<td>Multifunction service run by UCLA that allows a two-way exchange of data; users can download or upload data onto their own maps.</td>
<td>High: cf. two-way exchange of information</td>
</tr>
<tr>
<td>Neighborhood Knowledge Los Angeles (NKLA)</td>
<td><a href="http://nkla.ucla.edu/">http://nkla.ucla.edu/</a></td>
<td>Partnership / community mapping service</td>
<td>Beg / Int</td>
<td>Similar to NKCA but confined to Los Angeles. More emphasis on the dissemination of official data such as tax and property records</td>
<td>High: suggests that users use their found information to influence land use decision</td>
</tr>
<tr>
<td>Living Independently in Los Angeles (LILA)</td>
<td><a href="http://lila.ucla.edu/">http://lila.ucla.edu/</a></td>
<td>Advocacy mapping service</td>
<td>Beg / Int</td>
<td>Web-based map of disability services in the LA area. Detailed information added by users in the disability community to stress relevant services and resources</td>
<td>High: relevant information is added based on neighborhood knowledge regarding the needs of the disabled.</td>
</tr>
<tr>
<td>Application</td>
<td>URL</td>
<td>Features</td>
<td>Level</td>
<td>How Participatory?</td>
<td></td>
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</tr>
<tr>
<td>Common Census Map</td>
<td><a href="http://www.commoncensus.org/">http://www.commoncensus.org/</a></td>
<td>Perception map</td>
<td>Beg</td>
<td>High on user input, but output is defined by the experimenter</td>
<td></td>
</tr>
<tr>
<td>Crisis in Darfur – USHMM/Google Earth</td>
<td><a href="http://www.ushmm.org/googleearth/">http://www.ushmm.org/googleearth/</a></td>
<td>Advocacy/educational mapping</td>
<td>Beg/int</td>
<td>Low: users simply see genocide-related data; they are supposed to act on it by voicing their concern to government</td>
<td></td>
</tr>
<tr>
<td>Gentilly Neighborhood Mapping Center</td>
<td><a href="http://icpd.dartmouth.edu/viewer.php">http://icpd.dartmouth.edu/viewer.php</a></td>
<td>Disaster/advocacy mapping</td>
<td>Int</td>
<td>Low: participatory in end-product only, as recipient groups are urged to petition government based on spatial data they are given</td>
<td></td>
</tr>
<tr>
<td>NEDAP Financial Justice</td>
<td><a href="http://nedap.org/programs/mapping.html">http://nedap.org/programs/mapping.html</a></td>
<td>Advocacy mapping service</td>
<td>N/A</td>
<td>Mid: user-provided data, but GIS work is done by experts</td>
<td></td>
</tr>
<tr>
<td>South African San Institute – Cultural Resources Asset Management</td>
<td><a href="http://www.sanculture.org.za/body.htm">http://www.sanculture.org.za/body.htm</a></td>
<td>Cultural resource documentation</td>
<td>N/A</td>
<td>High on user input, but output is defined by the experimenter</td>
<td></td>
</tr>
<tr>
<td>Philippine Association for Intercultural Development</td>
<td><a href="http://www.iapad.org/pafid/about_pafid.html">http://www.iapad.org/pafid/about_pafid.html</a></td>
<td>Cultural resources / indigenous rights</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Many local governments have developed online GIS portals where citizens can look up information on their community or particular piece of property. Often totally web-based, data is usually for display purposes only and cannot be downloaded. One such example is the Chicago Police Department’s comprehensive website, where citizens can monitor and map crimes in the city, using official police records. However, citizens cannot add new information to the site to report crime events. Privacy concerns are also addressed; no exact addresses or names are available through the website.

4.3.4 Spontaneous PPGIS Activities

Our research identified a number of web-based mapping/analysis applications that are customized to meet the needs of a particular user community (e.g., bicyclists in New York or travelling salespeople). These web-based mapping applications use a freely available mapping platform like Google Earth and adapt it to display a specific attribute that is available at a user-selected location. For example, the website walkscore.com generates a “walkability” score for a user’s selected neighborhood, based on the proximity of mapped services, recreation and transportation access.

These niche projects are the most interesting PPGIS applications by far. The tools and PPGIS projects are a 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, address specific community aspirations. Examples include Chicago Crime Map, Trailhead Finder, and HotSpotr, 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.

These niche projects are characterized by their self-organizing capabilities and their ability to adapt to the needs of their community. They are very useful in providing end users with customized information about local neighborhoods, but there is no tangible evidence linking this kind of information access to the establishment of new participatory activities. On the other hand, these projects are also most likely to disappear once project-specific goals are achieved. For instance, the Chicago community-driven crime mapping website discussed earlier has been shut down by the creators.

The experience that I had guiding a student-led PPGIS project highlights some of the complexities associated with niche projects. Hunter College students Jason Nu and Wallace Murray wanted to advocate for the establishment of additional bike parking facilities in strategic locations in New York City. The premise was that more
people would ride their bikes to work if there were secure and easily accessible bike parking spots. User involvement was necessary to identify desired locations (actual sections of sidewalk where bike racks could be situated). Nu and Murray created a website that allowed users to post locations (points on a map) about desirable bike parking locations. When the project began, the students were concerned about lack of participation. They advertised their project and the website link on local blogs, particularly those blogs known to be bike-friendly. The project struck a nerve among the biking community in NYC, particularly in Manhattan and the website received a lot of hits! Over 800 locations for bike parking were suggested within the first 2 weeks. The data flood created technical and organizational problems for the students and they eventually had to shut the site down because they wanted to spend time analyzing the data that had been submitted. Unsurprisingly, many of the locations proposed by participants were proximate to other transportation modes, e.g., subway stations and bus stops. An interesting issue that came up through user comments was the need to engage owners of commercial buildings to provide secure bike storage for employees. The students found that established and regular bicyclists were more active on the site and that the needs and attitudes of casual bicyclists or non-bicyclists could not be gathered using the e-survey approach they had taken.

Once the project was complete, the students shared the results with the NYC Department of City Planning (DCP). Planners at NYC DCP were able to incorporate the students’ research into the department’s own strategic planning efforts. NYC has since expanded their commitment to bicycling in the city through a comprehensive strategy that includes the provision of bike racks near bus stops and in other strategic locations.

Niche projects can be set up quickly and phased out of existence; they have no need to perpetuate themselves. Once the City accepted the argument that bike racks were needed and began to plan for their placement, community advocacy about bike racks became less important. Niche projects are not sustainable in the long run unless they are transformed into commercial applications that can generate revenue through advertising or user contributions.

4.4 E-Survey

The web search and analysis of applications provided an overview of PPGIS activities (categorized along the 4 part typology, described above). It also generated a preliminary list of organizations that were targeted to receive the survey.

4.4.1 Survey Design/Distribution

The survey was designed and distributed using a free electronic survey development tool and hosting service. The survey design and my dissemination strategies
were reviewed by the Institutional Review Board (IRB)\textsuperscript{18} at Hunter College. After receiving IRB approval, I distributed the web link to the e-survey to my personal and professional networks via email. Subsequently, a description of the research and links to the survey were posted on various listservs and message boards frequented by actual PPGIS practitioners (PPGIS.net, IAP2) or more general community development communication vehicles (COM-ORG listserv) during in the first quarter of 2008.

### 4.4.2 Survey Questions

The survey consisted for eight closed-ended questions, and two open-ended questions (see Appendix). Questions 1 and 2 document organizational characteristics and the type of GIS service/applications provided. Question 3 and 4 delineate discrepancies, if any, between the intended audience (primary target audience) and actual users. Question 5 addresses the issue of organizational sustainability (asking whether the services were free to use or fee-based services). Question 6 seeks to catalog the diversity of data sources used for community decision making. Questions 7 and 8 get to the heart of PPGIS work – asking whether end users can add their own data to create customized analyses and whether such data is reviewed or checked for accuracy.

The framing of questions 7 and 8 is a further clarification that I place great emphasis on two-way information way as an essential ingredient of PPGIS work. In Chap. 3, this issue is discussed under the framework element “Methods of Engagement”. One would assume that most mapping services make some use of official data, for example a base map showing roads and town boundaries, major landmarks, or basic property data, yet I posit that participation can be significantly enhanced through the use of user-submitted data. In other words, a two-way flow of information can develop, as users add their own impressions and understanding of their community to an otherwise neutral map made up of lines and polygons. One example of the benefits of this approach is the Neighborhood Knowledge – Living Independently in Los Angeles disability awareness service, which relies on users to submit information regarding facilities and services they find helpful\textsuperscript{19}.

I sought to increase the response rate by minimizing the length of the survey, and ensuring anonymity. However, the final two questions provided respondents with an opportunity to leave their name, affiliation and contact information should they be interested in participating in follow up interviews.

Due to funding limitations, the e-survey was available only for a short time, through the months of February, March and April 2008. The following analysis represents a snapshot of responses as of April 1, 2008. However, the survey remained open through the month of April to collect responses from additional parties interested in our research. We collected between 115 and 126 valid responses (not everyone answered every question), although 258 individuals began the survey by electronically signing the informed consent form.
4.5 Analysis of Survey Results

4.5.1 Organizational Characteristics

In allowing survey respondents to characterize their organization, the question included eight separate descriptive phrases and a ninth “Other, please specify” option. However, respondents were only permitted to make a single choice – this required organizations to self-identify with the set of tasks that was most representative of their day-to-day work. Over one-third of respondents identified themselves as affiliated with a university in some way.

About 10% of respondents identified themselves as community-based, a category that included community development corporations (CDCs), community-based organizations (CBOs), or community-based data providers. Government data providers accounted for 13% of the respondents, while another 12% defined themselves as non-governmental organizations (NGOs), a category that included many of our international respondents. However, a full one-quarter of respondents selected “other”. This category included respondents from private consulting firms, the United Nations and affiliated agencies, state and local government agencies, and members of the general public (Fig. 4.1).

In casting a wide net, the survey reached a wide variety of organizations that saw themselves as doing some sort of PPGIS work. However, an e-survey, just like any survey, has its limitations in terms of outreach. Established organizations with active staff responded to the survey. The majority of respondents were affiliated with academia or government. Since this survey is a sample of PPGIS practitioners, one
cannot assume that this respondent profile truly captures the number and breadth of community-based PPGIS services.

The second question that focused on organizational goals, “which statement best describes your goals in offering GIS services or applications” allowed the respondent to select more than one choice. Close to two-thirds (61%) of respondents said that they hoped to encourage community involvement, while about one-third (36%) described their work as having more of an advocacy component. Information dissemination was also a popular organizational goal (61%). Other goals included more specific descriptions, such as “give people an idea of how issues and problems or opportunities look spatially and visually because statistics and [simple] graphs don’t always do that well”. Education was frequently cited as an organizational goal, among those who had selected the “Other” option, approximately (19% of respondents). This included education of “interested parties”, “high school students”, and “community members”, and “policy makers” (Fig. 4.2).

![Fig. 4.2 Organizational goals](image)

Drawing from the most prevalent responses to our goals questions, data provision (i.e. offering information) remains a top priority PPGIS activity. Yet, most PPGIS advocates would agree that data provision is a necessary but not a sufficient condition for an application to be considered PPGIS.

### 4.5.2 Intended and Actual Users of PPGIS Applications

Question 3 asked, “Who is your primary target audience?” in other words, who are you trying to reach? Unsurprisingly, a large majority of respondents selected the obvious answer “public” (45%). Other GIS application developers and service providers sought to reach professionals like community organizers (26%). The “other” category included “students/youth”, “elected officials” (29%). Many people
also selected “other” and wrote in a comment to state that they intended to serve “all of the above” which was not an option that I had offered in the framing of the question.

In response to the question, “who are the actual users of your services/applications”, 42% of the respondents said that members of the public were the actual users. While 27% stated, “same as above”, an overwhelming 72% stated that the actual users of their services were “professionals” (40%) or “community organizers/activists” (32%) (Fig. 4.3).

From these results, I conclude that PPGIS services and applications are being used to greater degree by a class of professional users – i.e., community organizers, researchers, journalists, policy makers, elected officials, and administrators of grant programs, rather than John and Jane Q. Public. It is also interesting to note that “youth/students” always stood out as a separate category, recorded under “other”, rather than being included as part of the “public” category.

There is nothing wrong in these services being used by professional users – journalists and organizers are as much part of the community they live and work in,
and can be considered members of the public. However, the numbers do draw our attention to barriers – educational and technical barriers that continue to inhibit the widespread adoption and use of PPGIS tools and applications.

### 4.5.3 Organizational Sustainability

Many community-based GIS activities are conducted with limited budgets and with volunteer support. Still others depend on funding from philanthropic organizations and government sources to continue their work. Earlier studies (e.g., Ramasubramanian, 1998; Elwood, 2000) have found that local organizations use GIS capacity to support work that is internal to the organization (like grant-writing) in addition to using the tools’ capabilities to directly support the mission of the organization. I wondered whether community-based organizations were using market-driven approaches to charge for services as a way to ensure organizational sustainability, but also as a way to manage demand (so as not to get overwhelmed by the number of service requests).

The survey results suggest that community-oriented PPGIS actors shun these market models (only 2% of respondents) said that they charged for services. Most respondents said that they made their data freely available, i.e., without charging for services and without requiring any user registration. I associated this finding with the rise of web-based mapping software. Coupled with a rise in Internet and broadband access, web-based mapping can make data quickly and easily available from a home PC. However, in reviewing the comments left in the “other” category (23%), I realized that many organizations and PPGIS service providers were grappling with this question, and most were considering creating password protected sites (limiting access) as well as investigating the potential for charging a fee to use their services.

The reluctance to charge for services is associated with the need to “democratize data”, translated by organizations to mean free access to public data. The costs/burdens of adding value to readily available public data are being borne by the nonprofit sector (foundation grants and the like) or by universities (especially in university-community partnership projects). However, these two models – dependency on philanthropic subsidies and on the benevolence of university researchers/projects sets up dependency relationships and creates tensions related to data ownership and control – a theme that has not fully been explored in the academic literature. Considering that 38% of our respondents came from university-based research centers, PPGIS adoption and use appears to benefit from, and be constrained by the academic enterprise.

### 4.5.4 Data Sources

Official records still form the “backbone” of PPGIS work; almost 75% of respondents reported using some form of government-generated data related to demographics, land use, crime, and physical and social environment in their day-to-day
work. Approximately 16% of respondents indicated that they harvested commercial records (information from yellow pages, real estate listings, advertisements) to create new analyses. Many respondents (52%) also indicated that they used direct observations – such as updating land use data received from the city files to correctly record vacant parcels or run-down properties to better reflect the realities experienced by their constituencies and to deliver more accurate/credible analyses. Community input (data provided by the public) was accepted as a reliable form of data input; over 41% of respondents said that their PPGIS systems allowed end users to submit their own data. In addition, approximately the same number of respondents (38%) reported that they verified user-submitted data for accuracy.

This is a wonderful finding, because the advantages of allowing for user input can easily be undermined if user-submitted data is incorrect or leads to faulty analyses. Checking the validity of user-submitted data, if done in such a way as not to undermine users’ contributions, can be an important step in creating a more developed PPGIS system, one that uses objective and possibly subjective knowledge to paint an accurate portrayal of community perspectives. However, it appears that the respondents to our survey have not completely resolved the tensions associated allowing for user updates to “official” data. A case in point – while working with a community group to determine the age of buildings in a Brooklyn neighborhood, one of my graduate students found a string of buildings with the year 1940 as the year-built date. However, one of the buildings was a historic building. Working with a long-time community resident, she unearthed some old newspapers and retrieved information to indicate that the building was actually built at the turn of the last century (Brisbane, 2005). However, neither she nor the community group she worked with was able to convince the city to update its official records. The city’s approach to handling discrepancies in data is very different from the approach taken by Wikipedia – the dynamic encyclopedia project that allows users to edit information. The fears that entries will get hijacked by special interests have largely been unfounded; egregious offences have only occurred on a handful of topics/postings.

4.6 Interview Findings

A total of eight professionals in the PPGIS field were selected for a brief (10–15 min) telephone interview in March 2008. The sample was drawn from a universe of 51 survey respondents who had provided their contact information and had responded favorably to the question, “Are you open to having a longer conversation about the topics raised [in the survey]?” Those interviewed included university professors, community-based groups and professional researchers. Respondents from outside the United States were not contacted for telephone interviews, because my research is focused on PPGIS activities in the United States.
This stage of research was designed to have PPGIS practitioners elaborate on concepts that were perhaps too broad for our e-survey. Primarily, the interviewer used this opportunity to speak with individuals about the extent to which the deployment of GI technologies influenced planning processes at the community level.

Understanding PPGIS outcomes proves to be a complex task. While all of the respondents were willing to discuss those “success stories” that they felt defined and validated their PPGIS work, many interviewees remarked that it was hard to precisely measure the effectiveness of their work. A university extension landscape architecture professor who works and trains participants explained the complexities in attempting to evaluate PPGIS activities. He observed that no two situations were alike, implying that a particular PPGIS application may work in one circumstance but fail in another. Context is everything, seemed to be the take home message, from these interviews. We will reflect more on the thorny issue of PPGIS evaluation in Chap. 8.

4.7 Next Steps

In practice, PPGIS work is a discontinuous series of steps; in which the first step is an attempt to make data/information/spatial analyses available to the public. Subsequently, the success of PPGIS activities depends largely on the management of the process – the ways in which individuals and groups are challenged to think critically about difficult problems. I am not trying to create divisiveness by distinguishing between “real” PPGIS and conventional mapping of social/physical assets and problems using GIS. Rather, the survey findings suggest that many individuals who are not working collaboratively with the community, still view themselves to be doing PPGIS work. The next three chapters take on a more in-depth look at case studies in three different contexts (the neighborhood, the city, and the region, respectively) to further articulate the dynamics of doing PPGIS work within the framework of on-going planning and decision-making efforts.

Notes

2. East St. Louis Action Research Project http://www.eslarp.uiuc.edu
3. Neighborhood Knowledge Los Angeles, http://nkla.ucla.edu is affiliated with the University of California, Los Angeles (Also see Footnote 17, in Chap. 3).
4. Gale Cincotta and Shel Trapp were community organizers in Chicago. They co-founded the National People’s Action (NPA), a coalition of community-based organizations and the National Training and Information Center (NTIC). These activists and the organizations they headed were instrumental securing passage of the Housing Mortgage Disclosure Act and the Community Reinvestment Act (Squires, 1992).
5. Richard Amanna, a graduate student in the Department of Urban Affairs and Planning at Hunter College, worked on many of these tasks under my direction in 2007–2008.
6. See http://rally-foundation.org
7. Open Space Accessible Information System (OASIS) http://www.oasisnyc.net/pages/about_OASIS.htm; Note that OASIS is now affiliated with a university, the City University of New York, Center for Urban Research.
8. 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 (1993–2007), 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.
9. Living Independently in Los Angles (LILA) http://lila.ucla.edu/; LILA 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.
11. 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).
13. The Hiking Trail Database at http://www.trailheadfinder.com/
14. Hot Spotr, a community driven site that finds wifi hotspots at http://hotspotr.com/wifi
15. For example, 2007 Workshop on Volunteered Geographic Information http://www.ncgia.ucsb.edu/projects/vgi/
16. A review of web postings about the site indicates that the creators felt that the services offered by their site were more effectively provided by other entities including the City of Chicago itself.
17. Survey Monkey www.surveymonkey.com
18. The Institutional Review Board (IRB) is an independent compliance committee designed to protect participants in human research. It is mandated by the US Department of Health and Human Services (DHHS, Title 45, Part 46 of the Code of Federal Regulations). The IRB process is intended to protect the rights and welfare of individuals recruited to participate in research activities conducted under the auspices of Hunter College. At Hunter College, the IRB has the authority to approve, require modifications in, or disapprove all research activities that fall within its jurisdiction as specified by both the federal regulations and institutional policy. The materials and the survey protocols submitted by the research team were reviewed by a committee established for this purpose.
Appendix: PPGIS Survey Instrument

PPGIS
Welcome: Public Participation Geographic Information Systems Survey Consent

Dear Colleague:

We invite you to participate in a short e-survey designed to understand the use and effectiveness of Geographic Information Systems that support public participation, an emerging field of study known as PPGIS (Public Participation Geographic Information Systems). This e-survey is part of research conducted by faculty and students at Hunter College of the City University of New York (Hunter).

Our research seeks to examine how PPGIS is applied in a variety of contexts to support and facilitate public participation. You have been contacted because we believe that your organization offers an application or service that provides the public with geospatial information in order to inform decision-making. Therefore, we invite you to participate in this research by responding to a brief e-survey that is expected to take about 10 minutes to complete.

Taking part is voluntary and your individual responses to all of the questions will remain confidential. Identifiable information is not required for participation.

While there are no direct benefits to you for participating in the survey, your considered responses to survey questions contribute to enhancing our understanding of the benefits and limits of GIS technologies that are designed to foster public participation.

We thank you in advance for your time.

Best regards,

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For information regarding the institutional approval process for this research, please contact:

Hunter College Institutional Review Board
Reference # HC-110713341
695 Park Avenue, Room E1426
New York, NY 10065
212-650-3053
http://www.hunter.cuny.edu/irb

Below, you are given two options:

By selecting “I’d like to participate; take me to the survey,” you have consented to participate in this survey and will be taken directly to the questions.
1. How would you like to proceed?
   - I’d like to participate; take me to the survey
   - I’d like to see the full consent information before I begin
PPGIS Consent

Through a review of internet-based resources, your organization has been selected to participate in a research study of Public Participation Geographic Information Systems (PPGIS) by faculty and students in the Hunter College Department of Urban Affairs and Planning. PPGIS is a developing field that explores the relationship through which the everyday public can become involved with using, designing or creating geographic information systems. Your project has been selected based on its attempt to inform the public through the use of spatial data. It is anticipated that approximately 25-50 organizations will be surveyed during this phase of research.

Please complete a short survey that seeks to explore the nature of your organization and the organization's role in engaging the public in different aspects of decision-making. It should take about 10 minutes of your time. Taking this survey is completely voluntary and will be used solely for furthering academic knowledge about public participation and geographic information systems. If you decide not to participate at this survey, you may exit the survey at any time and your answers will not be recorded.

We are making every effort to ensure that no one knows what your responses were on the survey. Survey Monkey is a well-known company that collects data for online survey research. The study is not being run from a secure server like those used to handle credit card transactions, so there is a small possibility that responses could be viewed by unauthorized third parties, such as computer hackers. Please consult Survey Monkey's complete privacy policy by clicking on the "Privacy Statement" link at the bottom of the company's home page (http://www.surveymonkey.com) Printed data collected by the researchers will be kept in a locked office cabinet, and only the undersigned researchers have access to your responses, via a password protected computer.

By clicking "next" and completing the survey, you are voluntarily submitting data to be used in academic research. No identifiable information is required from you, however, we do request that you select a description, from a list of choices, that best describes your organization. At the end of the survey, you have the option of providing contact information if you would like to be personally contacted for a further discussion of our research.

After the survey period is closed, on or about April 1, 2008, you may view the results on-line via a link that will be posted on this survey site.

For information regarding the institutional approval process for this research, please contact:

Hunter College Institutional Review Board
Reference # HC-110713341
695 Park Avenue, Room E1426
New York, NY 10065
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http://www.hunter.cuny.edu/irb

Please feel free to contact the undersigned researchers with any questions you may have or if you would like to be informed of more complete survey findings. Thank you for your participation.

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Click "Next" to take the survey!
1. Please select the statement that best describes your organization. (Select only one option)
   - Community-based data provider / data intermediary
   - Community-based data provider / data intermediary
   - Community Development Corporation (CDC)
   - Community-based Organization (CBO)
   - Non-Governmental Organization (NGO)
   - University-based research center
   - University-based community outreach or advocacy center
   - Policy research group
   - Other (please specify)

2. Which statement(s) best describe your goals in offering this GIS service or application? (Select all that apply)
   - To offer information to members of the public
   - To offer information to professional researchers
   - To engage / encourage community involvement
   - To advocate for community change
   - Other (please specify)

3. Who is your primary target audience? (Select only one option)
   - Professionals
   - Community Organizers / Activists
   - Public
   - Other (please specify)
4. Who are the actual users of your GIS service or application? (Select all that apply)

- Same As Above
- Professionals
- Community Organizers / Activists
- Public
- Other (please specify)

5. Do you require users to create an account or login before they can use your service or application? (Select only one option)

- Yes - Our service is free to use
- Yes - Fee-based service
- No
- Other (please specify)

6. Which statement(s) best describe the sources of your data? (Select all that apply)

- Official Records (e.g. property data, environmental data, crime reports, etc.)
- Commercial Records (e.g. phone book listings, advertisements, etc.)
- Community Input (e.g. citizen opinions about favorite places in the community)
- Direct Observation (e.g. staff-recorded data gathered through field observations)
- Other (please specify)

7. Can users submit their own data?

- Yes
- No
- Not applicable
8. Do you review user-submitted data for accuracy?

- Yes
- No
- Not applicable
1. Please share any comments that you feel would help us better understand the nature, goals and/or purpose of your organization.

2. If you are open to having a longer conversation with our researchers about these topics, please provide contact information (phone or email) so that we may reach you. Your information will not be shared with any outside organization.
PPGIS

Thanks!

Thank you for taking the time to complete this survey. Your responses will help us better understand the emerging field of PPGIS. Remember, once the survey is closed on or about March 1, 2008, you can view our findings at a link that will be posted on this survey webpage. Also, for more detailed findings, please contact the researchers:

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