Community Participation, Spatial Knowledge Production, and GIS Use in Inner-City Revitalization
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Rina Ghose

WHILE U.S. citizens have been participating in neighborhood planning for several decades, the 1990s marked a significant increase of grassroots community organizations participating in neighborhood revitalization efforts. This participation of community organizations in urban governance is the result of several factors. Citizens of inner-city neighborhoods have been increasingly vocal and active about their dissatisfactions with the revitalization agendas of local planning agencies that have often been conducted without sufficient input of the residents. To address these concerns, federal, state, and local government planning agencies have increasingly promoted and formalized collaborative planning strategies and public-private partnerships that offer opportunities of participation to traditionally marginalized citizens and their organizations. Simultaneously, urban governance strategies in the United States have promoted devolution of powers and responsibilities, which have migrated to community organizations.

In responding to these new opportunities for participation in formal urban governance, community organizations have begun to employ digital technologies for planning and service delivery. One particular technology, Geographic Information Systems (GIS) has proven to be essential to the efforts of community organizations. GIS enables storage, analysis, and mapping of geographic data such as demographic, housing, land-use, or environmental quality informa-

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tion, at multiple scales. Ease of visualizing and analyzing neighbor-hood-based spatial data makes GIS especially useful to neighborhood planners, citizens, and professionals alike. In order to address the high costs and complexity of obtaining GIS and spatial data, a range of "Public Participation GIS" initiatives have been implemented by many different institutions and actors to provide more equitable access to GIS and spatial data among traditionally marginalized citizens and their organizations. Such efforts have led to an unprec-edented number of GIS adoptions by grassroots citizen organizations. These activities indicate a significant bridging of the digital divide that has existed between the marginalized underclass and the more privileged classes of American society. It is the goal of this paper to investigate the role of GIS and the nature of its use among community organizations as well as the nature of the participatory GIS process and its varied impacts.

Research shows that the effectiveness and sustainability among community organizations of GIS use, along with its societal and political implications, are variable and complex, simultaneously empowering and disempowering—and highly contingent upon local factors. Because GIS efficacy is so dependent upon the specifics of particular cases, this paper investigates the case of the local political context in Milwaukee that has shaped citizen participation and GIS use among grassroots community organizations. It then explores how GIS and spatial data are being used among these organizations to participate in urban governance and challenge or reshape urban policies. The paper ends with observations on the general effects of GIS on community organizations.

The selection of Milwaukee is appropriate because over 17 grassroots community organizations of inner-city neighborhoods have been using spatial data and GIS in their participatory planning practices. Milwaukee also has a long history of GIS use in its local government planning agencies; indeed, one of the nation's first urban GIS systems was established in Milwaukee in 1975. Milwaukee has also made significant efforts to formalize citizen participation in inner-city neighborhood revitalization tasks. This paper explores Milwaukee's case of community GIS use through long-term ethno-graphic research, drawing upon a range of data sources such as interviews conducted with community organizers, planners, and other stakeholders, analysis of planning documents and community organization project reports, and, finally, participant observations. The study also builds upon the author's knowledge of the participa-tory planning processes in Milwaukee and her experiences with various university/community GIS partnerships.

Obermeyer
State Cartographer's Office
Ghose
Ghose and Huxhold 2001
Hutchinson and Toledano
Kellogg
Leitner et al.
Ramasubramanian
Sawicki and Craig

Aitken and Michel
Barndt 1998
Elwood "GIS and Collaborative..."
Elwood "GIS Use in Community..."
Elwood and Leitner
Harris and Weiner
Sieber 2002
Sieber 2000

Huxhold

The Local Political Context, Citizen Participation, and GIS Access in Milwaukee

Previous research indicates that the processes of establishing citizen participation and participatory GIS practices among community organizations are complex and contingent upon several factors—the willingness of local government to include community organizations as authoritative participants; to offer those organizations access to GIS; to have GIS experience and expertise within its own agencies; and to share digital resources such as digital city maps or government spatial data on housing conditions or tax valuations. Local governments must also be willing to establish GIS initiatives for resource-poor community organizations. In Milwaukee, we find that the presence of such contingent factors have helped resource-poor community organizations obtain access to expensive digital technology and data.

Citizen participation in planning efforts in Milwaukee's inner-city neighborhoods has been promoted because previous revitalization strategies were implemented by government agencies without sufficient citizen input, and led to strong criticism from inner-city residents. Consequently, citizen participation has been prioritized and formalized in Milwaukee, with local political officials viewing stronger citizen participation as a required element in neighborhood revitalization. Accompanied by a shift towards neo-liberal urbanism, the local political structure (including the Mayor's office as well as various governmental organizations) has emphasized an expanded role for neighborhood-based community organizations. But it has been apparent that these organizations lacked many of the resources to perform these functions—especially "digital" resources. Milwaukee's inner-city community organizations are extremely "resource poor," with strong financial constraints that limit their abilities to purchase expensive spatial data, install GIS software, acquire the appropriate hardware, or provide adequate training to their staffs. As a result, these organizations have been left behind in their ability to access and employ digital spatial data and technology.

Thus, Milwaukee's officials have tried to increase both citizen participation and access to digital technologies (particularly GIS), in order to provide optimal opportunities for citizen participation among inner-city residents. Since the mid-1990s, local government agencies have provided community-based organizations access to vast amounts of detailed public data. Local government agencies have shared data with other stakeholder institutions and have established a number of GIS initiatives to facilitate citizens' access to data. As a result of these

Elwood "GIS and Collaborative..."
Ghose and Huxhold 2001
Ghose and Elwood
Sieber 2002
Sieber 2000

Barndt 2001
Barndt 1998

Ghose and Huxhold 2002

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efforts, community organizations have been able to access spatial data and GIS technology.

Organizations Providing Access

Milwaukee's Departments of City Development and Neighborhood Services routinely provide participatory opportunities to citizens on a case-by-case basis. City officials advocate GIS use in planning and have made equitable access to GIS and spatial data an important priority in the city. Milwaukee has made its digital parcel maps and its extensive Master Property Database (MPROP) available to community organizations. Such a sharing (particularly data sharing) is rare since data sharing between institutions has been difficult to achieve in many other cities.

Because of its agenda of promoting citizen participation in planning, Milwaukee has also made it a priority to provide multiple ways of obtaining easy access to valuable city data. For instance, the City of Milwaukee provides its extensive Property Information Retrieval System to citizens via CD-ROM. The city has also used the Internet to create a user-friendly, Web-based GIS for the average citizen. Its "Map Milwaukee" project is a parcel-based Internet GIS that allows the user to query and map a vast array of property information (such as ownership, land-use, service requests, violations, etc.) that can be searched by either tax-key, single address, address range, or recorded last name. Such data sharing through the Internet allows citizens to bypass time-consuming trips to City Hall. Currently, the City of Milwaukee is also involved in creating an ambitious and original initiative called the COMPASS project. The COMPASS acronym stands for "Community Mapping, Planning, and Analysis for Safety Strategies," a federally funded collaborative project with multiple local partners. The project aims to create an Internet GIS that is built upon massive data sharing between the city, the Milwaukee Police Department, the health care community, faith-based organizations, community organizations, educational institutions (including Milwaukee Public Schools), and Milwaukee's business community. Once completed, this project will be a significant step in bridging the digital divide and will "empower individual citizens, help connect community groups to each other and to the government, give government agencies a richer data source, and provide researchers with a one-stop-shop for data." With these Web-based GIS initiatives, the city aims to effectively erase the barriers of distance, time, cost, and technical expertise for the average citizen and facilitate citizen participation among all sectors of society.

City of Milwaukee *Map Milwaukee Project*

City of Milwaukee *COMPASS*

Another government organization that has shaped citizen participation and GIS use is the Community Block Grant Administration (CBGA). The creation of Neighborhood Strategic Planning (NSP) in 1995 by the CBGA formalized both citizen participation (through neighborhood-based community organizations) and the use of GIS in Milwaukee. The NSP process aimed to undertake inner-city revitalization through a bottom-up approach, based upon the visions and desires of the neighborhood residents instead of a top-down, expert-driven process. The NSP process is also closely tied to the distribution of Community Development Block Grant funds that CBGA receives from HUD to revitalize deeply troubled inner-city neighborhoods. "CBGA relies on neighborhood strategic planning as the best way to target funds effectively, because it identifies the needs of an entire neighborhood instead of basing decisions on individual agencies' budget demands" *(54)*. In this process, 17 key community organizations of inner-city Milwaukee neighborhoods are provided GIS, data access, and technical assistance (through the Non-Profit Center, a key stakeholder institution) as well as an established funding base in order to construct formal neighborhood strategic plans for their neighborhoods, highlighting the strengths, weaknesses, opportunities, and threats facing each neighborhood. These strategic plans are intended to guide reinvestment and revitalization in these neighborhoods. Interestingly, CBGA has mandated that community organizations use spatial data and GIS in their construction of neighborhood strategic plans and has provided opportunities for doing so to even the most resource-starved community organizations in Milwaukee.

These strategies, along with the presence of supportive stakeholders, have enabled widespread GIS use among community organizations in Milwaukee and have encouraged them to actively seek out opportunities for the use of GIS and spatial data (either directly or through collaborations with stakeholders) in their organizational tasks. The stakeholder organizations have played a particularly significant role in championing citizen participation and facilitating it by providing access to spatial data and GIS expertise at little or no cost. Such key organizations include the Data Center Program of the Nonprofit Center and the University of Wisconsin-Milwaukee.

The former is a significant intermediary institution that acts as the largest coalition of community-based and other nonprofit organizations in Wisconsin. Its Data Center Program is a major data clearinghouse, providing access to a range of crucial spatial data (such as census data, health data, school enrollment data, environmental data, and crime data). It also provides, at a low cost, staff members who work with community organizations to provide customized data and GIS analysis, based on an organization's needs.

Huxhold and Martin

Ghose
Ghose and Huxhold 2001
Ghose and Huxhold 2002

Barndt 2001
Barndt 1998

The University of Wisconsin-Milwaukee is another intermediary institution that has a strong "urban mission" and is deeply involved in providing community service and urban revitalization initiatives. Many faculty members are involved in neighborhood planning and economic development. Through their courses and their research, they offer resource-poor community organizations a way of circumventing the obstacles to using GIS. Through numerous university/community partnerships, community organizations have been able to receive customized spatial data, GIS analysis, and free software, as well as detailed reports that include maps and tables, at no cost.

Ghose
Ghose and Huxhold 2001
Ghose and Huxhold 2002

Driving the Agenda

Citizen participation in the formal planning process has been recognized as a politically complex process, with asymmetric power relationships between community organizations and government. For instance, the more powerful government planning agencies may remain highly committed to the goals of citizen participation but still compel the less powerful community organizations to adhere to their (i.e., government agencies) planning agendas, approaches, and expectations. In Milwaukee, both local government agencies and private foundations have been able to influence which community issues are addressed. Housing, for instance, has become a major agenda item for community organizations because that is where funding opportunities exist.

Barndt 1998
Elwood and Leitner

We can see the consequences of community organizations pursuing opportunities in another matter. City agencies have strongly emphasized using GIS technology and spatial analysis to legitimize neighborhood claims and needs in community strategic plans and other documents. Consequently, community organizations in Milwaukee have felt a need to include numerical data and maps in their dealings with local government, not only to justify their concerns, but also to appear as informed and expert participants. However, local government agencies are well aware that inclusion of numerical data does not always guarantee their actual use by community organizations in their planning activities. As one former Milwaukee CBGA administrator (who was deeply involved in the NSP process) wryly responded:

Individuals understood that they needed to have some legitimizing force in it, that it would help their cause if they used numbers. In many ways, what they [community organizations]

simply did was to put [incorporate] the tabular runs that the Nonprofit Center had done, just put it right there [in their strategic plan document]. In some cases, it was my feeling they [community organizations] didn't even analyze the data; they just included it. [They felt that] if you look smart, you are smart.

Martin

The CBGA mandate of incorporating GIS-generated tables, statistics, and thematic maps in neighborhood strategic plans likewise has had mixed results. While some community organizations in Milwaukee viewed these instructions as well intentioned advice that actually aided in their long-term planning, other organizations were resentful of such instructions and barely analyzed the data and maps in their plans. The discontented community organizations felt that the mandate required them to spend too much time trying to master the data and technology, diverting them from understanding the actual community issues and envisioning strategies. The discontented organizers also felt that their experience was not valued unless they provided quantifiable data to support it. This is, in fact, a valid complaint, as even a local stakeholder organization admitted that, "the planners…are much more apt to be responsive to the data, to hard data. Anecdotal is good, but only if there is hard data first." The community organizations have thus justifiably perceived that if they use the language and methods of planners, they will gain greater attention and respect. Thus, the enthusiastic adoption of digital technology and the widespread use of spatial knowledge among Milwaukee's community organizations could very well be strategic moves, designed to create a positive relationship with local governmental organizations.

WHEDA

Nevertheless, the general popularity of using spatial knowledge in Milwaukee does provide a compelling reason to explore how community organizations have actually used it and GIS to address neighborhood problems, legitimize their concerns as evidence of their needs, and challenge or reshape urban policy.

The Use of Spatial Data and GIS

As a result of the various initiatives and supportive contingent factors, Milwaukee's community organizations are increasingly using GIS and spatial data in their various organizational activities. The barriers of cost and technical expertise have been largely overcome in Milwaukee by establishing a network of supportive resource-rich

organizations that act as GIS and spatial data providers to community
organizations. As previous research indicates, this is a common
strategy that resource-poor community organizations employ to gain
access to spatial data and GIS.

<div style="float:right">Leitner et al.
Barndt 1998</div>

My research indicates that Milwaukee's community organiza-
tions show maximum interest in using data that describe housing
conditions, economic development, crime and safety, and health and
environmental conditions. (See Table 1.) In addition, the organiza-
tions usually collect and maintain data regarding their members and
clients (including their addresses and phone numbers, their demo-
graphic characteristics, their participation in the community organiza-
tional tasks, and the services rendered to them).

TABLE 1
Types of Spatial Data Most Useful to Community
Organizations

Neighborhood Issue	Spatial Data
Housing	Ownership
	Zoning
	Land use
	Assessed land/structure value
	Tax exemption status of land/structure
	Structural information on buildings
	Year of change of assessment code
	Property transfer information
	Tax delinquency status
	Building code violations
	Raze status
	Vacant lots
	Boarded-up homes
Economic Development	Employment opportunities
	List of neighborhood businesses
	Membership in business associations
	Small business lending data
	Job training programs
	Youth leadership
Crime	Incidents listed by dates, locations, types
	Parole data
Health/Environment	Health statistics
	Hazardous material storage sites
	Lead contamination data
Property Investment	Private mortgage data
	Public lending data
School Data	Public school data
Client Data	Contact data about members, participants
	Date of participation
	Participation activities

Significantly, community organizations are increasingly interested in using these spatial data at different geographic scales such as at address level, at parcel level, and at block, block group, and census tract levels. This multi-scalar approach provides community organizations a chance to situate themselves in a broader political and planning context and to conduct cross comparisons, enabling them to examine the quality of life in their neighborhoods versus that of the entire city.

Ghose and Huxhold 2002

My research also indicates that Milwaukee's community organizations use geographic information to produce spatial knowledge that can be used to (a) confirm and legitimize existing experiential knowledge, (b) monitor neighborhood conditions and predict changes, (c) prepare for organizational tasks and funding recruitment efforts, (d) generate new information to enhance service delivery, and (e) explore spatial relations to challenge or reshape urban policy. Similar types of knowledge production and use have been noted in the case of Minneapolis and St. Paul.

Elwood and Leitner

Confirming and Legitimizing Existing Experiential Knowledge
While community organizations possess rich, local data based upon their experiential knowledge, they often use public databases in GIS to confirm and legitimize this knowledge. This strategy is particularly effective if the community organization seeks to challenge the city's inaction to its neighborhood concerns. Research indicates that community organizations have extensively used the highly detailed parcel-based MPROP database from the City of Milwaukee for a range of confirmation of persisting neighborhood problems. MPROP, built for tax assessment purposes, provides parcel-based data on ownership, zoning, land use, SIC code, past and present assessed land/structure value, past and present tax exemption status of land and structure, structural information on homes and buildings, year of change of assessment code, property transfer information, tax delinquency status, building code violations, and raze status. This large array of data is additionally enhanced by information on census tract and block number, police district, aldermanic district, building inspection area, and fire department district. It can be used in conjunction with other public databases such as census data or crime incidence data.

Ghose

Using MPROP in GIS, one community organization (Metcalfe Park Residents Association) of a deeply troubled and very poor neighborhood was able to both confirm a range of neighborhood problems and generate new information. Query searches were particularly helpful for this organization in tracking down absentee landlords or slumlords who took no responsibility for upkeep of their rental properties and allowed them to deteriorate.

One of the maps that was most useful to the Metcalfe Park Residents Association was the owner occupancy map, which confirmed what residents expected—that their Metcalfe Park neighborhood was experiencing a decline in owner occupancies. Confirmation of this knowledge then helped the organization prioritize actions in order to increase owner occupancy.

In another instance, the organization's effort to confirm local knowledge actually generated an opportunity for it to engage in an analysis of public data quality and accuracy. While examining a land-use map of the Metcalfe Park neighborhood generated from the MPROP data, members of the organization were able to confirm that a large number of vacant lots were present, indicating rising neighborhood deterioration. However, the organization also felt that there were more vacant lots present than were reported in MPROP. The organization then undertook a neighborhood survey in which it located every vacant lot and boarded-up house in the neighborhood by their addresses. The data and resulting maps showed the problem was greater than had been recorded in MPROP. The organization then used the land-use map in conjunction with their maps of vacant lots and boarded-up homes to serve as evidence of neighborhood decay.

Lastly, this organization conducted its own sanitation surveys to geographically locate the presence of abandoned cars, tires, and garbage—chronic problems that had not been addressed by the city. The maps, providing powerful visual evidence of neighborhood decay, convinced the city to take action. This organization was thus able to use geographic data in GIS to confirm its own experiential knowledge of neighborhood problems. That, in turn, helped the organization prioritize its neighborhood agenda, and provided strong evidence to the city in the form of statistical data tables and maps, resulting in positive actions.

Such experiences have convinced community organizers of the power of GIS and the advantages of using geographic information, not only as an effective tool to confirm neighborhood concerns, but also as an effective medium that facilitates building appropriate organizational strategies. As the community organizer of the Metcalfe Park Residents Association noted,

> for one, you can use [geographic] data to determine if you are being effective with your strategies, and if you are not, then you can change your strategies. Utilizing data to show different strategies…what can the data tell me about the changing property values, has homeownership been increasing or decreasing, what were the types of crime or number of instances

Metcalfe Park Residents Association

around the particular area where the decreases [of homeownership] are occurring, how do you cross reference that type of data? That's the way I perceive using data.

Despite the lack of resources at his organization, this community organizer is determined to have in-house GIS analysis facilities because he is convinced that spatial knowledge production and GIS use are necessary to formulate long-term neighborhood improvement strategies and to effectively participate in formal urban governance.

Monitoring Neighborhood Conditions and Predicting Changes
Community organizations are particularly interested in monitoring typical inner-city neighborhood problems such as urban blight, crime incidence, or health and safety violations, and have found GIS and spatial knowledge to be highly useful in these tasks because "sometimes numbers can really hit you, seeing a map can really hit you…I've lived in this area for twenty something years and I knew that there were vacant lots, but I didn't know the degree until I saw the maps." As the community organizer of the Metcalfe Park Residents Association noted, this type of knowledge production is not only necessary for monitoring neighborhood concerns over time, but also for predicting future outcomes. This type of predictive ability can then further facilitate the organization's participation in the City of Milwaukee's efforts devoted to inner-city revitalization. As he states:

Harambee

In the long run I am sure these [data and GIS] help you to understand the transformation of your neighborhood, and what types of instances occurred or activities occurred during that transformation, so that based upon those activities that occurred now you can predict some probabilities of the neighborhood turning around or getting worse. If I can say that on the 2500 Block of 31st Street that there were 20 homeowners in 1980, and between 1980 and 1990 there was an increase in homicides, there was an increase in burglaries and there was a decrease in homeownership, you know, I can say that I pretty much understand why that block is now infested with drug addicts and transient renters. I can look at blocks that now have four or five homeowners on it, and I can look at what types of things are happening around burglary, or how much money is being invested by the Department of City Development or private investors, and I can tell you in five years what type of block it's going to be.

Metcalfe Park Residents Association

Research indicates that community organizations are increasingly employing the Internet-based Map Milwaukee program to inspect the city's property data (MPROP) in order to monitor housing conditions in their neighborhoods. During these monitoring activities, community organizations are also undertaking data quality assessment, by comparing their own geographic records of neighborhood conditions (such as razed buildings marked in neighborhood maps) with the city's property data. Such assessments have sometimes revealed flaws in the city's data, which can take months to correct.

<div style="text-align: right">WAICO-YMCA (a)</div>

Representing spatial knowledge over time through thematic maps constructed in GIS also enables a community organizer to assess if past revitalization strategies were effective. This construction of spatial knowledge can assist in comparing and predicting future outcomes, which can then be elements in the design of neighborhood plans. Comparing thematic maps depicting crimes in 1994 against crimes in 1992 and 1993, the community organizer of Northwest Side CDC commented,

  [This] sort of information is really useful to us…because I can
  see where we are being effective. I can also take another
  document that lays over [this map] and you can see where all
  the businesses are…and you can see that there's less crime here
  and more crime up here, and it helps us and the police to do the
  kind of hotspotting that's very popular in community policing
  nowadays. You can do this [type of mapping] with anything.
  You can do this with business and other kinds of data. This
  happens to be for crime. But those [maps] are quite useful.

<div style="text-align: right">Technobytes</div>

This organizer also identified such spatial knowledge production and representation as an effective means of communication among its members.

  It's much more user-friendly in that respect and because of the
  color coding and the ability of just the mapping [it] gives people
  a real sense of what's going on in their neighborhood.

<div style="text-align: right">Technobytes</div>

This preference for thematic maps as GIS outputs by community organizations has been previously noted as well. The reason for such preference is that these maps depict spatial patterns and trends of neighborhood problems that are not obvious otherwise, thus providing answers to specific questions raised by community organizations, which are then addressed in strategic plans and presented to the City of Milwaukee and the CBGA office. Moreover, thematic

<div style="text-align: right">Elwood
Elwood and Leitner
Ghose</div>

maps can easily convey neighborhood problems among community organization members and thus play a positive role in organizational communication.

Preparing for Organizational Tasks and Funding Recruitment Efforts

As has been mentioned earlier, the Neighborhood Strategic Planning (NSP) process requires community organizations to generate spatial knowledge (by conducting community surveys and analyzing spatial data) and to assess such knowledge in their plans. Certain community organizations have creatively used such resulting knowledge, data, and maps across a diverse array of organizational activities. One organization, for example, continues to use the spatial knowledge generated during its NSP plan in the following manner:

> the implementation process is actually sitting down to talk about addressing [neighborhood issues]. Okay, let's pull those maps back out. Okay, we appear to have a concentration of one [issue] here, so why don't we concentrate our efforts over here.

Lisbon Area Neighborhood Development

These organizations further use their spatial knowledge to obtain funding support from various sources. Cutbacks in federal and state funding have increasingly compelled community organizations to seek and obtain funding from private organizations. The private organizations expect systematic and informed documentation, with records of past results, clear evidence of current needs, methods used to address such needs, and expected outcomes. GIS and spatial data are effective ways of formulating such documents. The task is easier when such activities can be linked to NSP plans. Describing one organization's continued use of the data and maps generated as part of their NSP plan, one university faculty member remarked,

> I think that the strong agencies, [such as] Harambee, figured out that, hey, we [have] to do this anyway….Banks and everyone start to expect it at some point. Most potential investors, and banks and even the national chains that have rediscovered the central city—they'd like to see a plan…[for] getting neighborhood development programs, attracting new businesses, you have to have a neighborhood plan, that gives us a snapshot of the neighborhood.

Sanders

The staff of the Harambee community organization feels spatial knowledge has given them the ability to obtain several collaborations

(such as an income tax training program and Americorps funding) and has made them better organized and better focused in their strategies. The organization employed spatial knowledge and maps in its daily organizational tasks. It has also used the NSP-generated thematic maps and demographic/economic statistics in seeking greater access to local government assistance programs for neighborhoods, as in its 2001 application for inclusion in the city's Targeted Investment Neighborhood Program.

Harambee

Generating New Information to Improve Administration and the Delivery of Services

A new trend has been to use geographic information creatively with the Internet to construct spatial knowledge that enhances service delivery and community organizing activities. The WAICO-YMCA organization, for instance, uses both in their goal of renovating blighted homes and increasing home ownership in their neighborhood. The organization first records the dilapidated housing stock in their neighborhood by address, then takes digital photographs of the blighted homes. It then digitally alters the photographs to show how the housing stock (along with the neighborhood) will look after the currently undertaken extensive renovations are completed. These are then advertised in the organization's Web page as a strategy for encouraging home purchases as well as inviting business investments in the neighborhood. Officials of the organization feel that this method of spatial knowledge construction has not only improved their own neighborhood knowledge, but also has assisted them in strategically addressing their major goals towards improving housing conditions, increasing home ownership, and attracting new business and employment opportunities.

WAICO-YMCA (b)

Another key example of creatively using the Internet and geographic information can be seen in the NeighborhoodNet program, established by the Northwest Side CDC as a new community-organizing program that enhances and improves traditional community organizing activities. Through its "computer donation program" this organization has goals to "put between 100 and 1,000 computers out in the neighborhood over five years—which will then mean that instead of getting two or three [reports] a day, we'll get 50 or 75 a day."

Northwest Side CDC

Northwest Side CDC

The program has helped "connect" community residents and resulted in innovative efforts such as the electronic Neighborhood Service Request Form. This form, found on the organization's Web site (*www.nws.cdc.org*), allows a citizen to report the address and details of a neighborhood problem. The organization then sends e-mail messages, listing the details of the problem (with an accompa-

nying digital photo) to the various departments within the city. According to the organization, this undertaking has been highly successful in obtaining immediate action from the city on problems such as "abandoned vehicles, blighted property, city service requests, drug activity, nuisance complaints, and landlord-tenant disputes."

Northwest Side CDC

The organization has also used the NeighborhoodNet to connect residents to each other. Through its listserve and an e-group, the residents, businesses, and public officials post messages, organize events, chat online, and e-mail each other regarding neighborhood concerns. E-group topics of discussion generally focus on "housing, youth, crime prevention, politics, employment, education, and community events." Digital pictures are routinely posted to record community activities and problem resolutions. Finally, links on the Northwest Side CDC's Web site to "churches, businesses, other community organizations, human service departments, schools, local government agencies, law enforcement agencies, and national partnerships" enable the residents to receive current information about the larger community of Milwaukee.

Northwest Side CDC

Northwest Side CDC

The community organizers of the Northwest Side CDC feel that cyber organizing (in conjunction with traditional organizing) has strongly empowered the citizens of their neighborhood. It has effectively erased the barriers of distance and time for "residents who aren't able to get out. We can donate a computer to them, and they can monitor activity…for the neighborhood," thus enhancing citizen participation. The community organizers feel that more residents have become aware of issues, not only on the neighborhood level, but also on a citywide level, and have become involved in resolving them. It has also increased their employability skills by providing them with computer training. Moreover, it has promoted community awareness and involvement among the residents while offering anonymity. As one community organizer noted, "people want to remain anonymous and be able to protect their neighborhood."

Northwest Side CDC

Northwest Side CDC

Lastly, the organizers feel that cyber-organizing has helped them to obtain more data regarding neighborhood conditions and problems. The organization generally enters the data by address in its database and then maps the data to see whether any trend or pattern can be detected, which, in turn, can be addressed in its strategic plan. In this way, the organization has built a rich database from experiential knowledge that they feel will be extremely valuable in strategically pursuing their neighborhood revitalization goals.

All this neighborhood information…residents will be able to create their own maps, charts, be able to go to public officials,

city officials and say, hey, this is what's happening in my
neighborhood, here are the numbers, here is the chart, here is the
illustration of what's happening in my neighborhood. I see
residents being able to voice their opinion on a larger level. I
mean, it's kind of like the HUD conversation where GIS is going
to help people communicate and to work with the government to
bring in more money that can fund certain programs in the
neighborhood. But I think it's bigger than that. I think it's actually
telling them exactly what's needed for my neighborhood.

Northwest Side CDC

Exploring Spatial Relationships to Challenge or Reshape Urban Policy

Community organizations in Milwaukee are increasingly using com-
plex GIS analysis to reshape urban policy on neighborhood
revitalization. In one case, a community organization, WAICO-
YMCA, and a partner organization, the Wisconsin Housing and
Economic Development Authority (WHEDA), used a GIS-based
indicators study to buttress its case for the creation of a residential Tax
Incremental Financing (TIF) district in their community. The study
covered a wide array of indicators including: the number of residential
properties, the assessed value of the residential properties, the number
of residential property sales, the owner occupancy rate, the extent of
public investment in housing, tax delinquencies and city foreclosures,
and mortgage and small-business lending figures. Information was
obtained from the city's MPROP database, the Home Investment
Partnership Program, Home Mortgage Disclosure Acts reports, the
Wisconsin Housing and Economic Development Authority (WHEDA),
and small business lending activity reports.

A notable aspect of this study was the comparison of these
indicators at different geographic scales and time periods. Each of the
indicators was examined at the parcel level for the targeted neighbor-
hood (the Lindsay Heights area), at the Community Development
Block Grant level (6,000 inner-city blocks of Milwaukee that receive
CDBG funding), and at the level of the entire city. The study also
examined the indicators over time—from 1993 to 1997. This type of
GIS-based, multi-scalar indicators analysis over time became a
powerful vehicle for assessing the quality of life of a specific troubled
neighborhood through a comparison to other geographic scales. This
was an effective strategy in pointing out the vast differences that occur
regarding the quality of life within the same city.

One of the eye opening pieces, of course when I talk about
getting the attention of the city, is to demonstrate that this

WHEDA

[Lindsay Heights] area, even in relation to CDBG [the rest of the inner city], is really very poor and very much neglected. And if there isn't a concentrated effort to change that, then in blunt terms, it's like a rot that grows in a rotten apple. It's going to spread, unless we change it.

The visualization quality of GIS became an excellent means of communicating the data among the neighborhood residents as well:

WAICO-YMCA (a)

The maps were very useful to us. They give a visual picture of what's happening in the neighborhood. The maps were great in presenting the information to the residents of the neighborhood. See, the information is so easy to read from the maps. So when we were presenting the study findings to the neighborhood residents in our monthly meeting, we used the maps heavily to explain the findings. It was easier for the residents to under-stand the information from the maps than from the tables, because of the visual quality and the use of colors.

This study ultimately proved successful because WAICO was able to convincingly present its case to the city, which then agreed to create its first residential TIF district in Milwaukee. In this instance, the production of spatial knowledge was effectively used to reshape urban policy and enable greater revitalization.

Altering Participation and Power Through GIS: A Critical Reflection

Pickles

Bridging the digital divide in order to facilitate citizen participation in urban planning is a complex and sometimes contradictory process. Digital technology undoubtedly occupies an important position in urban planning. Moreover, "if information is power…and if commu-nity is built through dialogue, then infomatics permit both to emerge for those who would otherwise have no voice and no space for collective action" *(10)*. Following the principle that effective access to information creates more opportunities for both better government and community empowerment, the issues of providing equitable access to digital technology among traditionally marginalized citizens is a critical one. However, we have to consider the complexities that are embedded in such issues.

Various viewpoints exist among scholars about the role of digital technology in facilitating citizen participation. Proponents of technol-

ogy have argued that technology's abilities to gather and analyze vast arrays of information is liberating and facilitates greater citizen participation in planning and decision making. Others inject a cautionary note by predicting the emergence of a more technocratic voice in planning—perhaps at the expense of citizens' experientially based local knowledge. Others argue that information technologies have contradictory effects, that they can be simultaneously liberating and limiting, depending upon the unique combination of historical, social, political, and economic conditions of particular places and situations.

In the case of Milwaukee, all of these aspects are present. Undoubtedly, digital technology has facilitated citizen participation in Milwaukee. The city's Internet-based Map Milwaukee Project enables community organizations to access property data without making trips to City Hall. Use of GIS technology has assisted the residents of Metcalfe Park to bypass the difficult and extremely time-consuming task of examining the paper format of the city's vast MPROP database for parcel-based neighborhood information. In addition, the query searches, spatial analyses, and visualization capabilities of GIS have increased the scope of what community organizers can accomplish.

On the other hand, the local political context does seem to inject a more technocratic voice in citizen-based planning efforts. In the case of Milwaukee, the policy of redistributing CDBG funds through Neighborhood Strategic Planning (NSP) processes is undoubtedly playing an influential role in the strategies undertaken by community organizations. While such a policy has encouraged and facilitated citizen participation in neighborhood planning, it has compelled community organizations to use spatial data and GIS. By doing so, it has directly contributed to the rising use of digital technology and GIS in community organizing activities. Moreover, community organizations have understood that strategic use of spatial knowledge and GIS will be met with approval and can further enhance their chances of participation in urban governance. Savvy community organizations have understood this and try to frame their arguments through empirical observations, statistical data, and GIS-created maps. Other community organizations are less successful in doing so and feel burned out by the stringent requirements of the NSP process. One organizer explained that her organization only briefly consulted the GIS-generated maps and statistical analyses, and that these materials were incorporated in the strategic plan, "…because it was required, no question. I wouldn't have put too many of those in there myself."

Thus it can be seen that the effects of GIS and other digital technologies are quite varied across different community organiza-

Heikkila
Klostermann

Aitken and Michel
Lake
Sheppard

Elwood "GIS and Collaborative..."
Elwood "GIS Use in..."
Harris and Weiner

Sherman Park Community Organization

tions, influenced strongly by factors such as leadership quality, organizational capacity, and resourcefulness in implementing technologies and spatial knowledge to their advantage. Consequently, the use of GIS has created divisions within inner-city neighborhoods. Certain neighborhood organizations like WAICO or the Northwest Side CDC have quickly grasped the advantages of using GIS and spatial knowledge and are making full use of them, either through collaborations with the university or independently, while others have lagged behind. My research also reveals that only those organizations that are less "resource poor" have managed to do so. In other words, organizations that have considerably more money and a greater number of staff are able to creatively generate spatial knowledge and then use it. These organizations are also led by organizers who are well educated and well versed in the use and power of digital technology. Thus, these organizations benefit from having a "technology champion" in a leadership position to advance the use of digital technology in community planning efforts and to justify the expenses that go along with such practices. In contrast, other organizations lacking either sufficient resources or "technology champions" were unable to use spatial data or digital technology effectively, despite having access to it. These organizations are also more reliant on GIS and data providers, unable to independently create effective spatial knowledge. In the case of Milwaukee then, it is evident that the introduction of GIS and other digital technology within community organizations has created its own set of power relations between those who have the capacity to use the new technical skills effectively and those who do not.

Bibliography

S. Aitken and S.M. Michel, "Who Contrives the 'Real' in GIS? Geographic Information, Planning, and Critical Theory," *Cartography and Geographic Information Systems* 22:1 (1995) 17-29.

M. Barndt, *Personal Interview* (with S. Elwood) (2001).

M. Barndt, "Public Participation GIS: Barriers to Implementation," *Cartography and Geographic Information Systems* 25:2 (1998) 105-112.

City of Milwaukee, *COMPASS* (2001) <www.milwaukee.gov/compass>

City of Milwaukee, *Map Milwaukee Project* (2001) <www.gis.ci.mi.wi.us>

S. Elwood, "GIS and Collaborative Urban Governance: Understanding Their Implications for Community Action and Power," *Urban Geography* 22:8 (2002) 737-759.

S. Elwood, "GIS Use in Community Planning: A Multi-Dimensional Analysis of Empowerment," *Environment and Planning A* 34:5 (2002) 905-922.

S. Elwood and H. Leitner, "GIS and Community-Based Planning: Exploring the Diversity of Neighborhood Perspectives and Need," *Cartography and Geographic Information Systems* 25:2 (1998) 77-88.

S. Elwood and H. Leitner, "GIS and Spatial Knowledge Production for Neighborhood Revitalization: Negotiating State Priorities and Neighborhood Visions," *Journal of Urban Affairs* (forthcoming).

R. Ghose, "Using Information Technology for Community Empowerment: Transforming Geographic Information Systems into Community Information Systems," *Transactions in GIS* 5:2 (2001) 141-163.

R. Ghose and S. Elwood, "Public Participation GIS and Local Political Context: Propositions and Research Directions," *Journal of the Urban and Regional Information Systems Association* (forthcoming).

R. Ghose and W.E. Huxhold, "Role of Local Contextual Factors in Building Public Participation GIS: The Milwaukee Experience," *Cartography and Geographic Information Science* 28:3 (2001) 195-208.

R. Ghose and W.E. Huxhold, "Role of Multi-Scalar GIS-Based Indicators Studies in Formulating Neighborhood Planning Policy," *Journal of the Urban and Regional Information Systems Association* 14:2 (2002) 5-17.

Harambee, *Personal Interview* (with S. Elwood) (2001).

T. Harris and D. Weiner, "Empowerment, Marginalization and 'Community-Integrated' GIS," *Cartography and Geographic Information Systems* 25:2 (1998) 67-76.

E. Heikkila, "GIS Is Dead; Long Live GIS!" *Journal of the American Planning Association* 64:3 (1998) 350-360.

C.F. Hutchinson and J. Toledano, "Guidelines for Demonstrating Geographical Information Systems Based on Participatory Development," *International Journal of Geographical Information Systems* 7:5 (1993) 453-461.

W.E. Huxhold and M. Martin, "GIS Guides City's Neighborhood Funding Efforts," *GIS World* (June 1996) 54-56.

W.E. Huxhold, *An Introduction to Urban Geographic Information Systems* (New York: Oxford University Press, 1991).

W. Kellogg, "From the Field: Observations on Using GIS to Develop a Neighborhood Environmental Information System for Community-Based Organizations," *Journal of the Urban and Regional Information Systems Association* 11:1 (1999) 15-32.

R. Klostermann, "Farewell to the Computer Reports," *Journal of the American Planning Association* 64:4 (1998) 470-474.

R.W. Lake, "Planning and Applied Geography: Positivism, Ethics, and Geographic Information Systems," *Progress in Human Geography* 17:3 (1993): 401-413.

H. Leitner, S. Elwood, E. Sheppard, S. McMaster, and R. McMaster, "Modes of GIS Provision and their Appropriateness for Neighborhood Organizations: Examples from Minneapolis and St. Paul, Minnesota," *Journal of the Urban and Regional Information Systems Association* 12:4 (2000) 45-58.

Lisbon Area Neighborhood Development, *Personal Interview* (with S. Elwood) (2001).

M. Martin, *Personal Interview* (2000).

Metcalfe Park Residents Association, *Personal Interview* (2000).

Z. Nedoovic-Budic, "The Impact of GIS Technology," *Environment and Planning B: Planning and Design* 25:5 (1998) 681-692.

Northwest Side CDC, *Personal Interview* (2001).

N.J. Obermeyer, "The Evolution of Public Participation GIS," *Cartography and Geographic Information Systems* 25:2 (1998) 65-66.

J. Pickles, *Ground Truth: The Social Implications of Geographic Information Systems* (New York: Guilford, 1995).

L. Ramasubramanian, *Knowledge Production and Use in Community-Based Organizations: Examining the Impacts and Influence of Information Technologies*, Ph.D. Dissertation, University of Wisconsin-Milwaukee (1998).

W. Sanders, *Personal Interview* (with S. Elwood) (2001).

State Cartographer's Office, "Gore Trumpets GIS Use in Communities," *Wisconsin Mapping Bulletin* 24:4 (1998) 1.

D. Sawicki and W. Craig, "Democratization of Data: Bridging the Gap for Community Groups," *Journal of the American Planning Association* 62:4 (1996) 512-523.

Sherman Park Community Organization, *Personal Interview* (with S. Elwood) (2000).

E. Sheppard, "GIS and Society: Towards a Research Agenda," *Cartography and Geographic Information Systems* 22:1 (1995) 5-16.

R. Sieber, "Geographic Information Systems in the Environmental Movement," in W. Craig, T. Harris, and D. Weiner, eds., *Community Participation and Geographic Information Systems* (London: Taylor & Francis, 2002).

R. Sieber, "GIS Implementation in the Grassroots," *Journal of the Urban and Regional Information Systems Association* 12:1 (2000) 15-51.

Technobytes, "Interview of Howard Synder," Milwaukee Public Television Interview (1996).

WAICO-YMCA, *Personal Interview* (with S. Elwood) (2001).

WHEDA, *Personal Interview* (2001).

R. Yin, *Case Study Research: Design and Methods*, 2nd edition (Thousand Oaks: Sage Publications, 1994).