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Removing Barriers to the Use of
Community Information Systems

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FROM THE FIELD

Removing Barriers to the Use of Community Information Systems

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ABSTRACT. Community information systems (CINS) are emerging as important tools for community, government, and educational organizations. This paper considers the training, evaluation, and outreach efforts relating to the Philadelphia Neighborhood Information System (NIS), a collection of online applications that integrate and distribute housing and demographic data. It presents an overview of the types of NIS users and uses and some specific examples of how the NIS is being used for individual property inquiries, community surveys, needs assessments, and research. Finally, the paper discusses the barriers to more analytical uses

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and offers recommendations for social work education aimed at preparing social workers to support community organizations in their efforts to harness the potential of CINS for social change. *[Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2005 by The Haworth Press, Inc. All rights reserved.]*

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INTRODUCTION

Community information systems (CINS) are springing up across the Internet, distributing large amounts of data about cities and neighborhoods, along with tools to make sense of them, to a wide range of community organizations. They offer much of the same functionality as geographic information systems (GIS) without the significant start-up and maintenance costs. Despite their promise, however, there are still significant barriers to using these new systems to support community change that are similar to those limiting the use of other new technologies in social work. This article describes the outreach, training, and evaluation activities aimed at overcoming barriers to the use of the Philadelphia Neighborhood Information System (NIS) and the specific ways community organizations and city agencies are using the NIS in their work. It concludes by discussing how CINS could be used in more analytical ways and the role of social workers in this process.

Researchers and practitioners within the fields of social work and city planning are increasingly recognizing the potential of GIS to support community development and social change efforts, earning them growing attention within the academic literature and professional conferences. GIS uses computer software to integrate, map, and analyze data with a geographic reference, such as street address, census tract, or zip code (Longley, Goodchild, Maguire, & Rhind, 2001). Mapped data can and is used for service delivery, planning, organizing and advocacy, building partnerships, and program evaluation (Local Initiatives Support Corporation, 2002). A limited number of community organizations and social service agencies have succeeded in implementing their own GIS, but significant costs associated with acquiring the necessary computer hardware and software, the steep learning curve involved in

using the software, and difficulties related to data collection make it difficult to get started (LISC, 2002; Chen, Harris, Folkoff, Drudge, & Jackson, 1999). Many of the successful examples involve partnerships between community groups and universities (Ghose, 2001; Chen et al., 1999).

CINs offer an alternative—or complement—to GIS by offering a broad range of users access to systems that are simpler to use and already have large amounts of data. Ghose distinguishes CINS from GIS primarily in terms of access and philosophy. A GIS becomes a CIS when it is designed with and for community users, reflecting their data and training needs (Ghose, 2001). Others describe CINS in terms of their technology and functionality. Wong (in review) describes them as an unrestricted Internet websites that provide geographic data to local governments, nonprofit organizations, educational institutions, and local media.

More than 200 CINS have emerged in recent years, in part because of advancements in computer hardware and software, nearly universal Internet access among community organizations in the United State, demands for democratizing data, and widespread efforts to help community organizations use neighborhood indicators to support their change efforts (Wong, in review; NNIP, 2003; Caulfield, 2003; Kinglsey, 1999; Kingsley, 1998; Sawicki & Flynn, 1996). By integrating and distributing administrative data and providing tools for generating descriptive statistics, queries, maps, and reports, CINS make it possible for community groups without the time, expertise, or technical skills to develop an in-house information system to reap the benefits.

Many CINS do not include mapping functionality, while others include pre-generated maps. Only 11 percent of CINS surveyed by Wong (in review) had the capacity for interactive mapping, but it is these systems that hold particular promise. CINS in Chicago (Chicago Neighborhood Early Warning System, 2003), Nashville (Nashville Metro Planning Department's Public Access System, 2003), New York (New York Public Interest Research Group's Community Mapping Assistance Project, 2003), and Milwaukee (Map Milwaukee, 2003) are among the limited number that allows users to create their own maps without having to invest in GIS technology, themselves. In Philadelphia, the Neighborhood Information System (NIS) fills this role.

Community organizations and social workers have yet to fully realize the potential of CINS to support their change efforts, in part for the same reasons that they struggle to adapt other forms of new technology. Initial resistance poses the first challenge, as agency computing environments may not support new hardware and software, staff may be re-

luctant to take the time to learn something new, and staff computer skills may not be sufficient (Drumm, McCoy, & Lemon, 2003). Motivation, basic skills and access to technology do not insure that community groups will be able to fully utilize new tools, however, and once these barriers are addressed, new ones may emerge. This paper describes the efforts of the Cartographic Modeling Laboratory (CML) at the University of Pennsylvania to work with community organizations and city agencies to overcome these barriers to use its NIS. It begins with an overview of the NIS and description of the outreach and training activities aimed at bringing the information and tools to new groups. It concludes with a discussion of the barriers community groups face in fully utilizing the CINS like the NIS once they have access and the role of social workers in addressing this challenge.

PHILADELPHIA NEIGHBORHOOD INFORMATION SYSTEM

The Neighborhood Information System (NIS) was developed by the Cartographic Modeling Laboratory (CML), a research center affiliated with the School of Social Work and the School of Design at the University of Pennsylvania. The NIS began in 1998 as a three-year, \$900,000 project funded by The Pew Charitable Trusts, William Penn Foundation and the University of Pennsylvania. The William Penn Foundation and the City of Philadelphia continue to provide financial support.

At its core, the NIS is a massive data warehouse that integrates address-level data from city agencies and other sources that relate to housing characteristics, vacancy status, and financial condition of the more than 600,000 parcels in Philadelphia, along with U.S. Census data. The CML receives data updates from the contributing agencies on a quarterly basis and uses them to support two separate web-based applications, the parcelBase and the neighborhoodBase. As their names imply, the two applications differ in the level of geography for which they provide data. The parcelBase includes information about all of the parcels in the city—each separate property, including residential structures, commercial and industrial buildings, and vacant lots—and allows users to identify an address on a parcel map, access data relating to ownership and condition (see Table 1), map administrative boundaries such as census tracts and zip codes, and query the database by property attribute and location. Users can also assemble parcels, save queries, and print reports. The data are displayed using the city's parcel map layer, which is licensed to the CML by the City of Philadelphia.

The parcelBase was designed to facilitate research on individual properties that otherwise would require numerous phone calls and visits to several different city agencies. Because of possible privacy issues and licensing restrictions, the parcelBase is a password-protected website available to city agencies and non-profit organizations approved by the Mayor's Office of Housing and Community Development (OHCD). As of September 2003, registered parcelBase users represented over 50 city agencies and nearly 200 non-profit organizations. During the first six months of 2003, there were between 1,500 and 2,200 log-ins each month.

The neighborhoodBase website (<http://cml.upenn.edu/nbase>) aggregates data from the parcelBase by several different geographies: city council districts, zip codes, school feeder areas, neighborhoods, census tracts, and block groups. The neighborhoodBase also includes data from the 1990 and 2000 U.S. Census for each of these geographies (see Table 2). Users can generate maps, tables, charts, summary statistics, queries, and neighborhood profiles. The neighborhoodBase was designed to facilitate planning and evaluation at the neighborhood level. Because it contains no data about individual properties or persons, there are no issues of confidentiality and the application is available as a publicly accessible website. In the absence of a login and password requirement, the CML cannot track the number of people using the neighborhoodBase, but users made between 6,000 and 10,000 hits (or data requests) each month during the first six months of 2003.¹

TRAINING AND OUTREACH

When the CML released the first version of the parcelBase in the summer of 2000, the application included online instructions, a data dictionary, and email links for sending questions and feedback. New users also received emailed instructions for using the application, along with a user i.d. and temporary password, after being approved by OHCD. Nearly all of the interactions between the CML and users took place via email and telephone, and most contacts were precipitated by the expiration of user passwords. During those first two years, the CML gave presentations on the parcelBase to city agencies, non-profit organizations, and foundations, aimed primarily at gaining the cooperation of data providers and building financial support. The CML offered a limited number of training sessions, but its ability to expand these was limited by staff and resource constraints. In addition, CML staff had

TABLE 1. Data Providers and Data Elements for ParcelBase Application

Data Provider	Data Elements
Board of Revision of Taxes	owner name, type of property, sale date, sale price, assessed value
Department of Licenses & Inspections	demolition, clean and seal, housing code violations, vacancy flag
Revenue Department	current tax bill, tax arrearages, lien sale flag
Water Revenue Bureau	water shutoff, water bill arrearages, vacancy flag
Philadelphia Gas Works	gas shutoff, vacancy flag
Office of Housing & Community Development	community foot surveys, digital photos of vacant properties
Office of the Fire Marshall	date of fire, cause, type of investigation
US Postal Service	vacancy flag based on "do not deliver mail" list

TABLE 2. Sample Data Elements in NeighborhoodBase Application

Residential detached, semi-detached, row houses (Board of Revision of Taxes)
 Multifamily, industrial, and commercial properties (Board of Revision of Taxes)
 Water, gas shutoffs (Water Revenue Bureau, Philadelphia Gas Works)
 City-owned, Philadelphia Housing Authority-owned properties (Board of Revision of Taxes)
 Vacant housing, vacant land (Department of Licenses Inspections, Board of Revision of Taxes)
 Residential sales, sales price (Board of Revision of Taxes)
 Housing code violations (Department of Licenses Inspections)
 Fires and arson/incendiary fires (Office of the Fire Marshall)
 total population (US Census)
 racial and ethnic composition (US Census)
 population under 18 years old (US Census)
 median household income (US Census)
 individuals living below poverty (US Census)
 individuals with high school diplomas, bachelor degrees (US Census)
 owner and renter occupied (US Census)
 median mortgage and rent (US Census)
 ratio of income to housing costs (US Census)
 median year structure built (US Census)
 individuals with physical disabilities (US Census)

Note: Most of these data elements are available as raw counts and percents. The user selects the level of aggregation: city council districts, elementary school catchments, neighborhoods, zip codes, census tracts, or census blockgroups.

strong technical GIS and database administration skills but limited experience with training and social work.

In the summer of 2002, the CML hired an advanced placement MSW student intern to become the outreach coordinator in order to expand the NIS user base, provide more training and support to users, and evaluate

the ways that the NIS was being used. The outreach coordinator spent the majority of her one-year field placement scheduling and leading trainings. The first four training sessions were held in August 2002 at the CML. All of the spots in the sessions quickly filled up, leading the outreach coordinator to organize additional sessions through October. These first trainings focused on the parcelBase application, with a brief introduction to the neighborhoodBase.

Because the neighborhoodBase was available to the public without a password, the list of registered parcelBase users provided only a partial list of potential users and training participants when the CML was ready to offer trainings focused on the neighborhoodBase. The outreach coordinator searched websites for lists of local organizations that she reviewed with other staff, used her own knowledge of community organizations, and obtained access to faculty and student email lists at the University of Pennsylvania to identify potential users. The response was once again overwhelming. In the first year of its expanded outreach program, 480 NIS users attended one of 44 trainings.

The training sessions generally lasted one hour. Participants introduced themselves at the beginning, described their previous experience with the NIS, and explained why they had come to the training. The session leader (usually the outreach coordinator) then provided an overview of the NIS and gave a live demonstration. The remainder of the group session was dedicated to questions, followed by hands-on time in the adjacent computer lab. Questions ranged from simple ones about performing particular operations to more detailed questions about the quality of specific administrative data from city agencies. Much of the discussion focused on data that users would like that are not currently available through the NIS, including information about public health, crime, neighborhood gardens, and religious institutions. The trainings helped the CML to learn how organizations were using, or hoped to use, the NIS applications. They also provided an opportunity to build relationships with users and receive feedback about the applications. The trainings also encouraged dialogue and networking among non-profit organizations and city agencies involved in similar community development work. Many sessions ended with participants exchanging business cards.

EVALUATION

The CML conducted an online survey in December 2002 in order to learn more about the ways the NIS was being used and to satisfy a reporting requirement by a project funder. The CML sent email messages to all parcelBase account holders and asked them to complete a 35-question survey about the parcelBase website, the neighborhoodBase website, existing support for the applications, and their overall usefulness. There was a 20 percent response rate, with respondents representing the broad range of users. About half of the respondents had attended one of the NIS trainings.

Results confirmed what the initial training sessions had suggested: users value the breadth of data in the NIS and use the application frequently. Roughly half of NIS account holders use ParcelBase on a frequent basis—at least once a week. In terms of information content, the five most highly rated data elements come from four different sources. In the absence of the NIS, users would have to contact multiple city agencies by phone or in person to obtain the same data. Over 60 percent of respondents had emailed or phoned the CML for help during the year, and nine out of ten rated the support they received as very or extremely effective. Application statistics maintained on a continuous basis indicate that for both the parcelBase and neighborhoodBase, the mapping is by far the most frequently used function.

In addition to the closed-ended online survey, the outreach coordinator conducted longer, open-ended interviews with users who either indicated in their on-line survey that they would be interested or that she identified as good sources for more information through the trainings. These interviews were the basis for a series of case studies developed to provide examples about how the NIS was being used.

In addition to the in-house evaluation, the NIS was part of a larger study of five web-based community information systems by a graduate student in the City Planning Department at the Massachusetts Institute of Technology (Caulfield, 2003). Seven individual evaluators conducted web tests of the five sites, each rating the site on twelve specific features. The lead researcher also conducted interviews with key people in each organization. Quantitative data from the web tests formed the bulk of the evaluation, while the interviews and literature reviews were largely used for anecdotal evidence and observations. The NIS received the highest overall ranking. Caulfield focused on the extent to which CINS had a mission to empower communities, enabled users to work

with neighborhood-level data, and incorporated dynamic and static GIS mapping.

T TYPOLOGY OF USERS AND USES

The NIS outreach, training, and evaluation efforts helped to identify many different types of application users and uses. Most of the users fall into three broad categories: community organizations and non-profits, government agencies, and educational institutions. Community organizations and non-profits primarily include community development corporations (CDCs), social service providers, neighborhood associations, religious institutions, and foundations. Government agencies include municipal, state, and federal agencies and elected public officials. Users from educational institutions, primarily colleges and universities, include students, researchers, and librarians. The numbers of parcelBase users are equally divided among community organizations and city agencies, with educational institutions representing a smaller group. Because users do not need to log in to access the neighborhoodBase, there is no way to know the groups they represent, but trainings included a greater proportion of users from educational institutions and non-profits than government agencies.

The ways in which most of these groups currently use, or anticipate using, the parcelBase and neighborhoodBase fall into two categories: basic property query and neighborhood needs assessment. Examples of more sophisticated uses of the NIS—including research, planning, service delivery, advocacy, and evaluation—were more scarce. After describing how groups were using the NIS, the barriers to more extensive and more sophisticated utilization—of the NIS and CINS, in general—are discussed.

BASIC PROPERTY INQUIRIES

Finding basic information—such as an owner’s name, sales price and date, outstanding code violations, or vacancy status—about private property without access to a CINS can be a frustrating and time-consuming process for community organizations and even government agencies. The NIS serves as a repository for a wide range of information that can assist them in dealing with nuisance properties and purchasing new

property. This is the most common way that community groups and city agencies use the NIS.

The Mayor's Office of Community Services (MOCS) supports a broad range of city programs and community development initiatives and investigates residents' complaints and questions. MOCS staff used the parcelBase to look up an abandoned property that neighbors complained was being broken into repeatedly. With the information from the NIS and help from MOCS, the residents then wrote letters to the property owner and city officials. As a result, the Department of Licenses & Inspections cleaned and sealed the property. Without the parcelBase, MOCS would not have the time to help residents research nuisance properties.

Project HOME is a large social service agency that provides a wide range of services to homeless and formerly homeless people. They are also involved in community development in parts of North Philadelphia, focusing on the creation of low-income housing, open space for community gardens, and new jobs and businesses. They use the parcel Base to identify blighted properties in their service area for purchase and renovation, relying primarily on the information about ownership and debts against a property. They have developed their own database, by cutting and pasting information from the parcelBase, and a collection of maps, created in the parcelBase and hand-colored by their staff for reports and proposals. Project HOME also uses the neighborhood Base to identify areas in particular need of intervention, incorporating the census data into their proposals to acquire specific properties.

The Queens Village Neighbors Association (QVNA) focuses on town watch, clean streets, and zoning issues in a fairly wealthy neighborhood just south of Center City, Philadelphia. They use the parcelBase to identify the owners of neglected properties so that they can send them letters, a process that has brought some results. In one case, they discovered that a large vacant lot was made up of four individual parcels with three different owners. They have also used the parcelBase to identify vacant properties in their neighborhood that they have petitioned their city council representative to include in redevelopment activities relating the Mayor's Neighborhood Transformation Initiative, a major initiative aimed at demolishing dangerous properties and clearing land for redevelopment.

The University of Pennsylvania's Department of Public Safety (DPS) is broadly responsible for the quality of life and security of members of the University community living and working in University City. DPS has used the parcelBase to identify properties in the neigh-

borhood with open code violations. They then inquire about the details of those violations at the Department of Licenses & Inspections. Using this approach, they identified a high-rise apartment building with open fire code violations. DPS then approached the owners of the building with this information and requested swift action. Without the query by location capabilities of the parcelBase, they would have no efficient means of identifying problem properties in their service area.

The South of South Neighborhood Association (SOSNA) provides services to, and advocates on behalf of, residents of an area just below Center City that has experienced significant gentrification in recent years. SOSNA members used the NIS to protect a neighborhood garden developed on two blocks of land from condemnation. When the city included the property on its condemnation list, SOSNA members used the parcelBase to identify the owners. They took this information to their city council representative, hoping to have the property made part of a city land trust. SOSNA members also looked up other properties in their neighborhood that were on the condemnation list and discovered that one of them had been occupied by its owner for 40 years and that other properties were part of an area known to all as “Miss Maggie’s Garden.” SOSNA members have taken up these causes, as well, and hope the city will be convinced to take control of other abandoned lots in the neighborhood that SOSNA members have identified using the parcelBase.

The Neighborhood Gardens Association (NGA) is a community-based organization dedicated to ensuring the preservation of community gardens and open space in Philadelphia’s moderate and low-income neighborhoods. NGA helps individuals and community groups to identify and acquire sites for gardens and provides assistance in maintaining and improving gardens. Using the parcelBase, NGA can identify the owners of vacant lots to make it easier for residents to acquire them. NGA also uses the querying function within the NIS to identify lots that meet certain specifications and are located within specific neighborhoods.

A last example of a property inquiry represents a unique use of the NIS. The Philadelphia/Camden High Intensity Drug Trafficking Area (HIDTA) is a federal initiative that assists local law enforcement officials in drug trafficking investigations. The Philadelphia Police Department has its own extensive crime mapping system, but HIDTA looks to the NIS to gather information about the properties and neighborhoods in which suspected dealers live and operate. In one case where the HIDTA could not determine where a suspected dealer was living, they used the parcelBase to research properties in the area where he was operating. Eventually they discovered that he owned one of the nearby properties

and passed the information on to local law enforcement officials who were able to apprehend him there. HIDTA also uses maps and charts from the parcelBase to assist their investigations. They use multiple databases—including Lexus/Nexus and Auto Track—to gather their information and often use the NIS to verify the information they find from these other sources.

NEIGHBORHOOD NEEDS ASSESSMENT

A large number of community groups and students also use the NIS to conduct needs assessments of neighborhoods as part of a grant proposals or coursework. These efforts take advantage of administrative data, primarily, but also include examples of community groups using the NIS infrastructure to share data they collected through foot surveys.

The Women's Community Revitalization Project (WCRP) is a non-profit organization involved in housing development, training, and advocacy for low-income households in Philadelphia. Most of their work focuses on neighborhoods in the eastern section of North Philadelphia. In applying for a grant to provide additional services to a section within their service area, they consulted the parcelBase to identify the block groups included within the boundaries identified by the funder. This allowed them to look up relevant data from the U.S. Census to identify the particular needs of that area.

A team from the University of Pennsylvania's School of Social Work established a partnership with groups in the East Parkside neighborhood in West Philadelphia in order to bring more resources for after school programs to the neighborhood. The team from the School of Social Work identified a suburban church as a key ally in the project. Using information about poverty and housing conditions in East Parkside from the neighborhoodBase, the team gave a presentation to a group from the church to demonstrate the needs of the community.

Students in the first-year practice classes in the MSW program at the University of Pennsylvania are required to complete a study of a community served by their field placement agency. Students are asked to identify demographic characteristics, political and economic structures, service availability and resources, and power relationships. Some students have used the neighborhoodBase to access relevant census data to identify the race and economic characteristics of their communities. Because the neighborhoodBase also includes map layers showing the loca-

tion of schools, libraries, and parks, it can also help them to identify resources in their community.

The Van Pelt-Dietrich Library at the University of Pennsylvania is the main library on campus, and librarians at its reference desk are available to help with student, faculty, and administration inquiries. The CML held a special training session on the neighborhoodBase for the librarians. The neighborhoodBase is one of the resources they now direct students to when they are conducting research about communities in Philadelphia. The ability to choose from many different geographic levels is particularly helpful to them. Before being introduced to the neighborhoodBase, the librarians had to rely on the U.S. Census website, which provides data aggregations only for census geographies.

University City District (UCD) is a business improvement district designed to maintain a clean and safe environment for the businesses and people in University City, the neighborhood around the University of Pennsylvania, University of the Sciences, and Drexel University. UCD senior staff quickly recognized the value of the NIS and wanted to add new data to the system. In the summer of 2001, UCD undertook a foot survey to identify all vacant lots and buildings in their service area. The CML worked with the Philadelphia Association of Community Development Corporations (PACDC) to develop a standardized survey on vacancy. UCD summer interns were trained in the use of Pocket PCs and digital cameras and were out in the field collecting primary data within a matter of a few hours. The UCD vacancy survey generated digital photos of over 550 vacant lots and buildings that were then integrated into the parcelBase, allowing other users access to the data and allowing UCD to map, query, and analyze their own data alongside other NIS data elements.

In the summer of 2002, the Philadelphia chapter of the Local Initiative Support Coalition (LISC) identified eight commercial corridors in low to moderate-income neighborhoods to be targeted for economic development activities. They determined that being able to collect and access specialized data about the types of businesses, parking conditions, hours of operations, and vacancy conditions would help their effort. The CML worked with LISC and PACDC to develop a commercial corridor survey template and trained staff members in the use of Pocket PCs and digital cameras. Now corridor managers can view the survey results and photos along with all of the other data in the parcelBase to develop strategies for advancing their corridors.

ACADEMIC RESEARCH

The NIS was designed to support the work of community groups and city agencies as well as academic research. In some cases, researchers export relevant variables directly from the online applications. In other examples, they ask CML staff to create a dataset from the NIS data warehouse.

A team of researchers from the Graduate School of Education (GSE) at the University of Pennsylvania worked with CML staff to use data from the neighborhoodBase to understand the influence of neighborhood environment on child development. The GSE team used factor analysis to identify latent relationships among a wide range of housing and demographic data included in the NIS. The analysis identified four distinct dimensions: social problems, structural danger, racial composition, and property structure. This research will allow for further inquiry into the relationship between neighborhood context and early education outcomes (McDermott, McWayne, Fantuzzo, & Culhane, 2002).

Researchers at the CML used data from the parcelBase to identify the strongest predictors of housing abandonment. Based on the literature and the NIS data, they identified three aspects of housing abandonment: functional, financial, and physical. Utility code violations, clean and seals, and vacancy flags were used as proxies for functional abandonment; tax arrearages and lien sale flags were used as proxies for financial abandonment; housing code violations and demolitions were used as proxies for physical abandonment. Researchers used logistic regression to identify the strongest predictors of imminently dangerous status for residential properties. Properties indicated as vacant by a foot survey, owned by the City, with water disconnections, and open code violations were all significantly more likely to become imminently dangerous (Hillier, Culhane, Smith, & Tomlin, 2003).

PLANNING AND EVALUATION

Program planning and evaluation may involve a needs assessment, but they represent a more focused and sophisticated use of CINS. The one example of how the NIS is used—or will be used—for planning and evaluation comes from the Philadelphia Neighborhood Development Collaborative (PNDC), which provides technical assistance and financial support to eleven CDCs in parts of the city with particularly high levels of unemployment and shortages of affordable housing. PNDC

uses the neighborhoodBase to identify the census tracts corresponding to PNDC's service area and to gather demographic and housing information. PNDC anticipates using the neighborhoodBase to evaluate the impact of PNDC-funded services over time in those areas. PNDC also uses the parcelBase application to identify potential sites for commercial opportunities in these communities, taking particular interest in the information about the financial condition of these properties, including tax arrearages, lien sale flag, water account information, and the property's condition.

PROSPECTS AND LIMITATIONS OF CINS

The ability to query administrative data and generate reports and maps to support a needs assessment make CINS very useful to a wide range of community groups and government agencies. Being able to search large databases and map spatial data without having to collect the data or purchase and learn how to use GIS software saves them enormous time and frustration. But why are so many users of CINS like the NIS stopping with these basic tasks rather than using CINS for program planning, evaluation, and even service delivery? It is in using CINS as a tool for analyzing patterns, not just looking up data, that they hold the most promise for social change. Romer, Wachter, and Wong (2002) make this distinction in their survey and analysis of what they term community statistical systems, referring to "transactional" and "analytical" uses, acknowledging that these systems have a much harder time promoting the latter.

Part of the explanation relates to CINS, themselves. While they contain large amounts of administrative data, most of them do not include all of the information that community groups, government agencies, and researchers want or need. The most common suggestion from NIS users is to add additional data elements, such as a comprehensive list of liens against a property, aerial photographs, more information about health and social conditions, and historical data. Building the data warehouse—and the relationships that enable the data exchanges—take time. Eventually the NIS applications will include more data elements—including information about community assets—and more historical data.

Because the NIS applications run over the Internet, their functionality is much more limited than what a stand-alone application could support. Advances in software such as ESRI's Arc Internet Map Service (ArcIMS) and programming languages such as Java and XML will

make it possible to build online applications that can do more and operate more smoothly. Newer versions of the neighborhoodBase will include a trends function as well as the ability to define neighborhood boundaries interactively. The NIS family of applications has expanded to include muralBase (<http://cml.upenn.edu/murals>), featuring Philadelphia's collection of public murals and their artists as well as crimeBase (<http://cml.upenn.edu/crimebase>), created in collaboration with the Philadelphia Police Department to share aggregate, historical data on a wide range of crimes.

While additional data elements and functionality can be programmed into an application like the NIS, in many cases what users really need are their own GIS. CINS have the potential to provide information and basic mapping functionality to a wide range of users, but some users will still need more data and greater functionality than they can offer. For example, Project Home in Philadelphia has been using the parcelBase to create its own database and map collection. They would have much more flexibility to make maps if they had the ability to integrate, display, and analyze their data directly, but currently they have neither the staff nor the GIS software to do this. Student interns provide a cost-effective way for community organizations to incorporate GIS into their work, but what they save in money they likely lose in continuity. An additional limitation of CINS is that most focus on an individual city. Some cities have nothing while other cities are served by multiple systems. CINS vary in quality, the amount and type of data, and functionality, and there has been little effort to standardize their data content, interface, or functionality (Wong, in review).

While CINS can be created to overcome some of these limitations, other barriers to using them for more analytical tasks resemble those that inhibit the use of other technologies in the human services. One of the biggest barriers is lack of experience potential users have in interpreting quantitative data. Patterson and Basham (2003) argue that spreadsheets hold great promise as tools for evaluation in the human services, but human service professionals are not accustomed to data visualization. Those using spreadsheets to create standard deviation enhanced line graphs (SDELG), surface plots, and area graphs, for example, must be prepared to teach their audience how to interpret them. Similarly, community groups, government agencies, and even academic researchers need assistance with both the technical and conceptual work involved in using CINS for analytical tasks.

The CML launched more advanced training modules for neighborhood Base and parcelBase in the fall of 2003. These trainings focused on assembling parcels, querying the NIS database, exporting tables, charts, and maps, and defining one's own geography. But in addition to having an outreach coordinator with social work skills, application developers like the CML need trained partners at community groups and umbrella organizations like LISC and the Philadelphia Association of Community Development Corporations (PACDC) that provide technical assistance to community-based organizations. Social workers involved in community practice are in an excellent position to serve this function, but at present social work curricula and field training do little to prepare students to take on this role. The increasing role of technology in internal communication, marketing, service delivery, and data sharing within the field of social work demands that emerging social workers be flexible, open-minded, and well trained (Sowers & Ellis, 2001; Reisch & Jarman-Rohde, 2000).

Social work students at the BSW or MSW level need basic research and computer skills for working with quantitative data—constructing data sets, evaluating measures for reliability and validity, and generating descriptive statistics. They should have experience working with small area administrative data such as that gathered for the decennial census. Through the U.S. Bureau of the Census' American Factfinder website, users can access specific data from a wide range of census products and generate tables and maps and download data for further analysis. While they may not have the opportunity to develop GIS and programming skills, social work students should be introduced to CINS. The National Neighborhood Indicators Project website (<http://www.urban.org/nnip/>) provides information on a wide range of them located throughout the country. While social work curricula should be adapted to meet this growing need, field practice internships with research organizations and community organizations can also provide opportunities for this kind of learning.

Finally, social work students need to be trained in ecological theory so that they understand the role that environment plays in the well being of individuals, groups, and institutions. Only by understanding how geographic patterns reinforce poverty, racism, and other forms of oppression and appreciating the critical role that the environment plays in education, health, housing, and employment outcomes will social workers be able to fully utilize CINS. The NIS represents one of the strongest CINS in widespread use, but as the NIS experience has demonstrated, it will take concerted—and cooperative—efforts to unleash their full potential for supporting social change efforts.

NOTE

1. Each user session may involve multiple data requests.

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