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Community Geography: Addressing Barriers in Public Participation GIS

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Early advocates of Public Participation Geographic Information Systems (PPGIS) envisioned a future in which members of the public (broadly) and members of marginalized communities (specifically) would utilize geographic information and spatial technologies to affect positive change within their communities. Yet in spite of the emergence and success of PPGIS, open source geospatial tools, and the geoweb, access barriers recognized by proponents of PPGIS in the mid-1990s persist. As a result, PPGIS facilitators continue to be instrumental in addressing access barriers to geospatial technologies among resource poor organizations and marginalized groups. ‘Community geography’, is a growing area of academic geography that leverages university community partnerships to facilitate access to spatial technology, data, and analysis. Experiences from community geography programmes at three universities (Chicago State University, Syracuse University, and Columbus State University) demonstrate the benefits and challenges of a facilitated model of PPGIS.

Keywords: community geography; PPGIS; participatory GIS; university–community partnerships

INTRODUCTION

It has been 20 years since participants at the National Center for Geographic Information and Analysis (NCGIA) Initiative 19 meeting first conceptualized ‘Public Participation GIS’ (Craig *et al.*, 1999). Attendees described PPGIS as being ‘attached to the particular problems of bringing a wider public into effective use of the [GIS] technology at whatever level its development may have attained’, (Schroeder, no date). PPGIS has had many successes in geospatial technology diffusion since 1996, particularly building on the emergence and success of open source geospatial tools and the geoweb (Brown and Kytä, 2014). Yet in spite of these successes, many of the barriers discussed by early PPGIS proponents persist and new challenges have emerged alongside new technologies (Barndt, 1998; Elwood, 2006; Sieber, 2006). Two decades after Initiative 19, our collective experience indicates that community-based and grassroots groups in the U.S. (and beyond) want to utilize geographic inquiry and GIS but continue to lack capacity – namely the time, skill, and financial resources needed to use geographic information and technologies. In this article, we discuss how ‘community geography’ (CG) mitigates GIS access constraints that continue to burden resource poor community-based organizations.

Community geography is a small but growing subfield in geography. In team with community members, it applies geographic methodologies to community problems. Following the lead of Harvey (1984) and Bunge (1971), CG particularly focuses on work which confronts existing power structures to allow under-resourced communities to better address community development challenges, including access to technology. Like GIS centers, CG programmes connect local organizations to geographic methodologies, but may utilize a multiplicity of methods, not all based in computer technology. CG programmes at Chicago State University, Syracuse University and Columbus State University have facilitated PPGIS projects through a broader focus on community-based participatory research (CBPR) (Kindon *et al.*, 2007). Despite profound differences between these universities, their locations, and their approaches to CG, each has successfully implemented unique models of CG in ways that have provided value to community partners. In addition to these programmes, active CG programmes in the U.S. include the University of Central Florida, the University of Georgia, and Skidmore College.

In the subsequent sections of this article, we first review GIS access barriers discussed in the PPGIS literature and the various ways in which facilitators and intermediaries of

PPGIS have (and have not) abated these barriers. We then propose CG as an effective means of advancing PPGIS, particularly focusing on four key elements. Finally, we relate examples of facilitated PPGIS from three programmes, followed by a discussion that explores how CG advances PPGIS goals and where challenges persist.

PERSISTENT BARRIERS TO GIS ACCESS AMONG COMMUNITY-BASED AND GRASSROOTS ORGANIZATIONS

Access barriers that were described in the mid-1990s/early 2000s by PPGIS scholars and practitioners are largely relevant today. PPGIS literature discusses access barriers that include human, financial and technical resource constraints; inappropriate, inaccessible or nonexistent data; and the ephemeral nature of grants and programmes designed to address technological divides (Barndt, 1998; Craig and Elwood, 1998; Merrick, 2003; Sawicki and Craig, 1996). Elwood (2006) points out that barriers encompass unequal access, disparate power arrangements, a lack of opportunity to participate, and inadequate representation of alternative knowledge. These barriers can often be insurmountable for resource-poor community groups. Interviews among community groups and community leaders revealed that 'access is a multidimensional concept that not only includes the ability to obtain data, hardware and software, but also the community groups' awareness of GIS and information sources, and the ability to apply the technology and information in ways that are useful for their activities' (Elwood and Leitner, 1998). Sieber speculated that it 'is quite possible that the dynamic nature of grassroots organization implementation will prohibit most ... from ever "routinizing" a GIS' (Sieber, 2000, p. 26). Elwood acknowledges that 'while the financial costs of hardware, software, and data have dropped and the options for acquiring and representing spatial information are greatly expanded for the most advantaged users, at the bottom of the digital divide relatively little has changed' (Elwood, 2006, p. 694).

PPGIS FACILITATORS AND INTERMEDIARIES

Recognizing the aforementioned barriers, Public Participation GIS initiatives frequently involve a person or entity that facilitates GIS access, knowledge transfer and capacity building. In fact, models that incorporate intermediaries have been endorsed as having significant potential to improve accessibility. In 2001, the National Science Foundation and the European Science Foundation cosponsored a meeting in Spoleto, Italy entitled, *Access and Participatory Approaches in Using Geographic Information*. Meeting participants concluded that, 'there is an inevitable gap between geographic information infrastructure and those who know how to develop and use it, and the constituents who stand to gain the most from its use. The term "facilitator" implies that those with expertise should be helpful, but not try to set the agenda for the identification and resolution of community problems' (Rugg, 2003; Rambaldi et al., 2006). Haklay and Tobón (2003) acknowledge the need for

'chauffeurs' to assist non-technical users gain the most benefit from GIS and 'facilitators' to aid users in reflection and analysis, stating that '... in an ideal situation, it would be better to have a chauffeur/facilitator rolled into the same person ...'. This requires ... competency in GIS combined with qualitative research and facilitation training' (Haklay and Tobón, 2003, pp. 583–584).

Barndt (2002) argues that intermediaries can provide access so that community groups can remain focused on their principle objectives (Barndt, 2002). Sawicki and Peterman's (2002) national survey of organizations presumed to be involved with PPGIS initiatives examined the role of data intermediaries. They classified respondents into four categories: governmental agencies, quasi-autonomous nongovernmental organizations (or non-profit organizations), community learning centres, and university centres. Sawicki and Peterman suggest that each approach has its shortcomings. Governmental agencies that provide community-based groups with GIS analysis typically only do it on a small scale, and often rely on interactive mapping websites to make GIS data available to the public. Non-profit organizations that develop in-house GIS expertise and then provide these services to CBOs, at low or no cost, must contend with funding constraints. Community learning centres provide space and access to the requisite hardware and software but generally do not become directly involved in community causes. University centres facilitate PPGIS with community groups, relying on the expertise of professors and students. Analyses may be more complex and more directly meet the needs of the community, but projects are often short lived as they coincide with the academic calendar and variable research interests of faculty and students. University faculty is also constrained by academic reward systems that prioritize peer reviewed publications. This tension may lead to a bias toward projects that will result in publishable research (Leitner *et al.*, 2000; Leitner *et al.*, 2002; Sawicki and Peterman, 2002).

Facilitating technology transfer also has its limits. Faculty and students at Portland State University developed The Portland State Community Geography Project at the Institute of Portland Metropolitan Studies at Portland State University to assist community groups with GIS analyses. As part of their PPGIS activities, they provided GIS training to community members so that once a project was complete, community members could continue to use GIS on their own. However, the project coordinator lamented that, 'we quickly became aware that building the capacity within many community-based organizations was problematic because of overworked staff and the fluidity of the adult volunteer workforce' (Merrick, 2003). The project abandoned training community groups and focused more on providing GIS-related services to community organizations (Merrick, 2003). Similar challenges were experienced at the Virginia Commonwealth University (VCU). The Richmond Neighborhood Indicators project, developed by faculty and students at VCU in 1998, aimed to integrate geographic information into a participatory community planning process. The original intent was to provide GIS training to community partners so that the project could be sustained after VCU became less involved. The project coordinator states 'our naïve assumption was that the role of VCU

faculty and students would diminish over time, the [community partner] staff would learn to use the system and they would work directly with the CDCs to develop community plans based on the newly available set of indicators. As it turned out, the expensive software training was immediately forgotten' (Rugg, 2003). As an alternative approach, students at VCU continued to act as facilitators, collecting and processing geographic data, and responding to community organization requests (Rugg, 2003).

The recent advent of the geoweb and open source mapping tools are mitigating the need for facilitators in PPGIS. Indeed, cartography is becoming 'undisciplined' in this regard and opening up access to a broader audience. However, as Crampton and Krygier point out, 'Open-source mapping is only effective when people have access to the technology, whether it be the internet, a PC powerful enough to run the software, and perhaps most importantly the knowledge to use it. The distribution of these resources is spatially uneven, as a number of studies of the digital divide have shown' (Crampton and Krygier, 2005, p. 19, citing Chakraborty and Bosman, 2005).

COMMUNITY GEOGRAPHERS AS FACILITATORS OF PPGIS

Community geography is emerging as a model that addresses both persistent and emergent GIS access barriers. CG's model combines the role of 'chauffeur' and 'facilitator' described by Haklay and Tobón and embeds PPGIS activities within a community-based and participatory action research framework. Ideally, CG has the following key elements: (1) it develops sustained, reciprocal relationships between university and community partners; (2) it negotiates collaborative knowledge production and shared power (3) it is able to respond to a variety of community priorities in a flexible way, and (4) it leverages the assets of universities and broader communities to bridge the spatial digital divide.

CG is predicated on the long-term commitment of faculty (and/or staff), university administrators, and students to community partners and their research needs. Through this commitment, community geographers are empowered to be more responsive to community needs, and therefore become trusted partners and resources in the community. Community geography also contributes to universities' educational missions by creating opportunities for skill development and meaningful community engagement for students and researchers. And while CG faculty members are not entirely relieved of their traditional scholarly obligations, they typically are afforded some level of support and freedom that validate their approach. Because of these intentional, reciprocal relationships between university and community, CG is better able to transcend the traditional limitations of a university-based facilitator model (Leitner *et al.*, 2000).

CG uses geographic and participatory approaches to investigate community-identified priorities and to inform community action. CG is influenced by feminist and radical geographic inquiry, PPGIS and Critical GIS, as well as research approaches that stretch outside of the discipline,

including Participatory Action Research, Community-Based Participatory Research, and participatory planning.

CG also utilizes a flexible approach, using context appropriate approaches and tools. The research process is a collaborative endeavour between traditionally trained scholars and 'community scholars' who possess vast local knowledge and experiences. It emphasizes the co-production and dissemination of spatial data, information and tools that are context appropriate, and often involves long-term partnerships between the university and community organizations (Robinson, 2010). CG investigates topics that largely affect underrepresented and marginalized populations – food insecurity (Block and Bouman, 2007), social, environmental and health disparities (Miller *et al.*, 2015), access to services, green spaces (Hawthorne *et al.*, 2015), housing, transportation, education, and neighbourhood quality to name a few.

In practice, CG research projects are often pursued in partnership with underserved communities or those who provide services to underserved communities. CG projects vary in scale and scope, spanning the gamut of long-term research collaborations, one time projects such as assistance with a single map or survey, service learning collaboration with university students, or building and strengthening community networks and collaborations. Within these projects, CG uses a diverse set of participatory approaches and mixed methodologies, including Geographic Information Systems, Global Positioning Systems, statistical analyses, open source and sketch mapping, surveys, interviews, observations, and photography to gather and create data to answer community-defined research questions. GIS is often, but not always, used in CG projects.

COMMUNITY GEOGRAPHY AT THREE INSTITUTIONS OF HIGHER EDUCATION

Chicago State University

The Chicago State Neighbourhood Assistance Center (NAC) was created in the mid-1990s to facilitate university–community partnerships that leverage the resources and skills of Chicago State's Geography programme and other academic programmes towards a goal of helping foster community-led development on Chicago's South Side and southern suburbs, a predominately African-American area with a large number of low-income households. The NAC began as a grant-supported programme, but until recently was supported primarily through state funds. Partnerships often utilize GIS, although projects may also incorporate non-spatial statistical analyses. While NAC projects do not always meet a strict definition of PPGIS, they incorporate a large variety of geographic practices into projects that support community needs.

The ways in which the NAC facilitates access to GIS vary greatly. In one example, the NAC and a group of community partners received a grant to develop 'Food and Fitness' plans for three Chicago communities. Through a series of meetings, email exchanges, and phone conversations with partnering community leaders, poster-sized food and fitness asset maps were developed for each community and community

meetings were called to conduct a SWOT (strengths, weaknesses, opportunities, threats) analysis and draft plan for each community. During meetings, participants were provided with sticker dots and pens that they used to annotate the maps with community assets. Consensus building was then used to refine the mapped assets. The maps were then digitized and further improved using an iterative process between community partners and NAC faculty, involving numerous joint editing meetings. The final electronic maps were used as community organizing tools by the community leaders to develop food and fitness plans and to inform their more general goals of promoting community health.

Three contrasting projects illustrate the flexibility in NAC's approach, utilizing PPGIS in most cases, but not always resorting to geographic tools. In one example utilizing PPGIS, the NAC completed a map showing the territories of multiple networks of food pantries in the Chicago area. Members sketched the boundaries on a paper map and included a written description of them. A community representative then sat with the cartographer and jointly edited changes in ArcGIS. In a second example, assistance with survey development for a study of area corner stores was requested by a local social service agency. The NAC helped develop the survey, which was then carried out by a youth programme organized by the agency. Maps were requested to show the results of the survey. The maps were presented at community meetings as part of an ongoing project to improve food access (Figure 1). In a final example, the NAC chose to facilitate something other than a PPGIS project. This example involved the Community Health Worker (CHW) Local Network, a growing professional network of Chicago-based community health workers and the Chicago Metropolitan Agency for Planning. In this example, the NAC responded to a request for mapping assistance, but when it became clear that there were three competing organizations offering mapping assistance, but none offering assistance with survey development, the NAC coordinated a survey of CHW's in an area of Chicago's North Side. Because of its flexibility and responsiveness, the NAC was able to fill an unmet need in the community that extended beyond GIS.

Syracuse University

Syracuse University hosts the Syracuse Community Geography (SCG) Programme, which was created in response to recommendations made to the university by a grassroots coalition called the Syracuse Hunger Project that called for a 'community geographer' position at the university to respond to the spatial analysis and mapping needs of community-based organizations working toward social justice in the Central New York region. The first community geographer (a staff position) was hired in 2005 with funds from a local community foundation and the university. In 2012, the community geographer position was converted to faculty and a graduate student assistantship was created to support CBPR and PPGIS.

SCG is regularly called upon by local community-based organizations to facilitate access to spatial and non-spatial data. Negotiating access to sensitive data from public and non-profit agencies is a persistent challenge for community members interested to use data to inform their programmes,

outreach and advocacy. Through established relationships with local data providers, SCG facilitates data sharing agreements on behalf of community partners, stores sensitive data, and uses GIS to manipulate the data so that generalized patterns and trends of sensitive data can be opened up to community partners and the broader public. SCG also maintains a repository of local spatial data, amassed over time through projects and partnerships. The data are made available to the public through an online interactive map and downloadable datasets.

One PPGIS project facilitated by SCG helped a refugee resettlement agency to map refugee housing patterns to better understand housing demand and supply (Figure 2). The results and data from the refugee housing PPGIS project were subsequently used to inform another PPGIS study conducted by SCG students working in partnership with a neighbourhood-based community development organization that wanted an updated neighbourhood needs assessment. Since the organization services the neighbourhoods that predominantly receive refugees, the data collected and analysed on behalf of the refugee resettlement agency was crucial to understanding neighbourhood dynamics. The results of this project were made available to other organizations and community members through SCG's publicly accessible data and map repository and because of a commitment to building community networks through data sharing and transparency.

In sum, SCG mitigates spatial data access barriers by (1) helping community partners create new data (2) opening up access to non-spatial and proprietary data to community partners, and (3) creating opportunities to share data with other organizations and the public at large.

Columbus State University

Columbus State University houses a geography minor in the Department of History and Geography which offers both bachelor's and master's degrees in history. The History master's programme requires a research tool (language or GIS) and the most popular choice for graduate students is GIS. In 2005 Columbus State's first geographer was hired, and the second was hired in 2010 when the Columbus Community Geography Center (CCGC) was created. The CCGC allows faculty to better enable university-community partnerships that engage the skills, training, and disciplinary interests of its faculty and engage a broad, predominantly first generation student population with real-world problem-solving.

CCGC projects are wide-ranging: from food insecurity to historic preservation and cultural heritage interpretation. One of CCGC's more extensive projects introduced PPGIS techniques to a group of approximately twelve girls (from 6 to 15 years of age). Classes were offered through an already established girls' summer camp programme at a public housing development. The city's housing authority was about to embark on a massive redevelopment plan, and faculty from geography and theatre worked to engage youth in the plan, specifically supporting spatial thinking, critical analysis of contemporary neighbourhoods, embodying space, developing verbal confidence through theatre exercises, and imagining and designing a new mixed-income residential community (Becker *et al.*, 2015; Rees *et al.*, 2016).



Figure 1. Map of corner stores prepared by the NAC using data collected by Centers for New Horizons. The NAC went on to develop a survey instrument to collect data from corner stores by youths

This project required the cultivation of relationships between the local afterschool and summer programme for girls at the public housing development, the local housing authority, the children’s parents and the children. The CCGC also facilitated the involvement of cultural geography college students in ways that peaked their professional interests (many are training to be middle and high school educators) and that also addressed a community need. CCGC students interviewed a public housing authority architect

about citizen engagement in planning processes. The students incorporated interview information into lesson plans that they developed during a three week May class, which were then used in the girls’ summer programme. For this project, facilitated resources came by way of Legos, secured from the state of Georgia’s Legos Education programme. Project outcomes included a three block neighbourhood plan that integrated a Google Map with Legos and hand drawn images of the girls’ desired neighbourhood amenities

Refugee Resettlement by the Center for New Americans by Neighborhood (2003-2011)

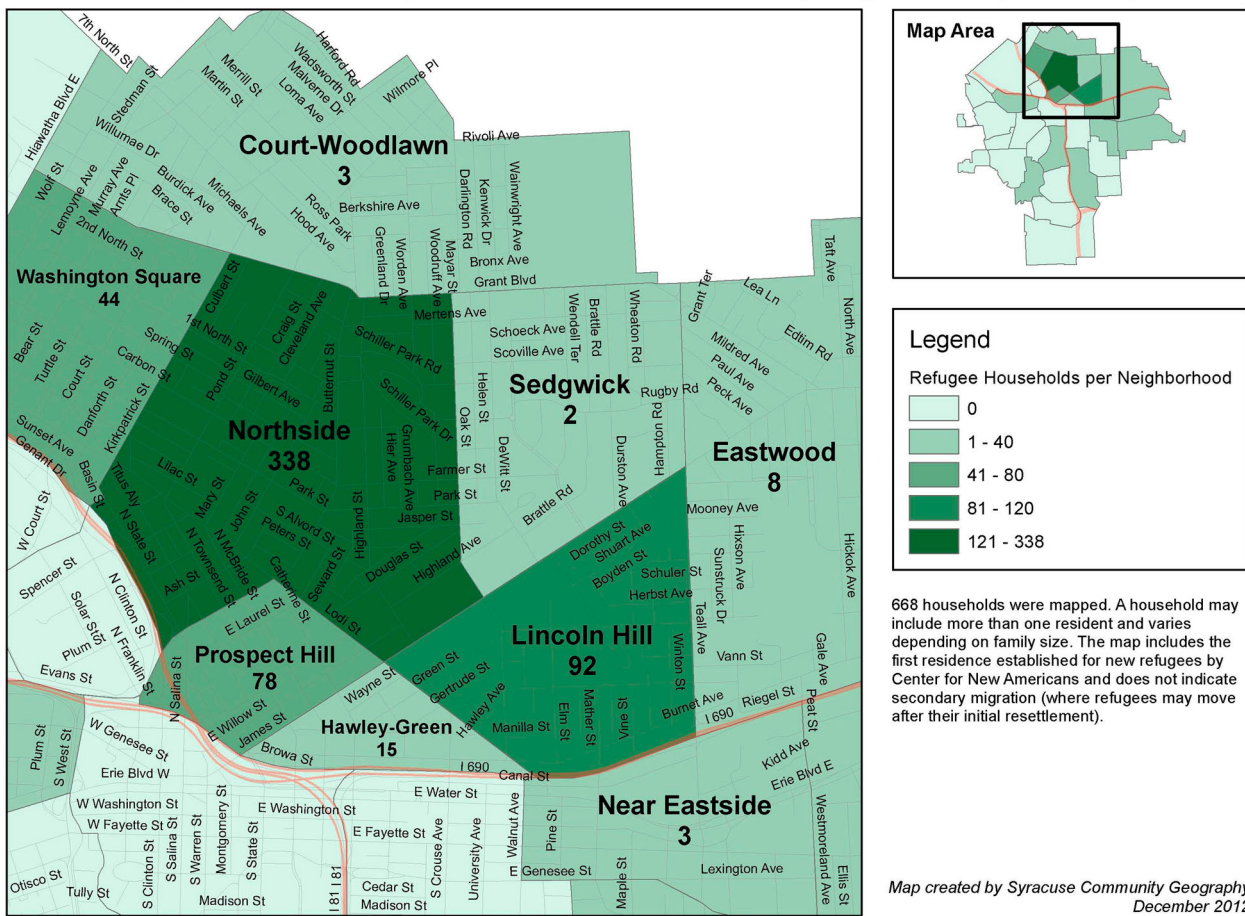


Figure 2. Maps of refugee resettlement patterns in Syracuse created by SCG in partnership with the Center for New Americans. Data and maps created for this project were archived and later used to support planning and fundraising by a neighbourhood association

(parks, ponds, bike paths, a dog path, a community garden and a treehouse church) (Figure 3).

Repeated delays in the planning process meant that the children’s presentation of their work at a local planning meeting was not possible. Instead, CCGC faculty facilitated the children’s presentation of the plan to an invited representative of the local housing authority. With subsequent delays and changes in personnel, faculty connected new employees to the work of the community partner project. The project facilitated a relationship between a typically neglected population and the planning process for a future public housing site. Exclusion occurs either due to the lack of confidence in the ability of young people to effectively participate in community planning (Checkoway, 1998; Gurstein *et al.*, 2003), or the more general marginalization of youth in the planning of low-income communities, despite evidence that youth are likely to have the freedom to inhabit those spaces moreso youth in higher income communities (Bauder, 2001; Ellen and Turner, 1997; Hart, 2002; Laughlin and Johnson, 2011; Travlou *et al.*, 2008). The summer programme facilitated a process that supported the children’s capacity to assess and articulate their concerns and their vision for a future community.

DISCUSSION

Community geography is still emerging and empirical evidence of its success is limited but the three centres presented here offer opportunities to explore further PPGIS facilitation within broader university–community partnerships. The efficacy of the CG model thus far seems largely attributable to the consistent presence and long-term commitment of community geographers in their local communities. This doesn’t happen by accident; it is enabled through both institutional support and community buy-in. These factors are made possible by establishing reciprocal relationships between the university and community partners. Our institutions can and do support CG because it supports institutional missions. CG provides opportunities for faculty to conduct relevant research. Involvement in CG projects provides valuable experience to students (e.g. technological and research skills). Meanwhile, community partners benefit by gaining access to university-based technologies and research expertise.

Upon a foundation of reciprocity, CG is able establish a shared power dynamic with community groups and partners. From the outset, CG projects are bottom-up in that they grow out of community-generated research priorities. Shared



Figure 3. Children's three-dimensional, Legos-Google Map mashup created by youth working with the CCGC. The Center used a medium other than GIS that was appropriate to its audience to engage marginalized youth in urban planning

control over the research agenda and research process redistribute power. CG emphasizes collective ownership of data, maps and other products among partners and the public at-large. Community geography cultivates the uniting of local knowledge and experience with academic and government data and knowledge. Data that integrate community and academic knowledge can exceed the accuracy of either one alone.

Flexibility is also an integral component to CG and manifests itself in several ways. Some community partners need simple Cartesian map products but have nowhere else to turn. CG is able to respond to these requests, often by matching a student with the requisite skills to fulfil the request. Other projects require more effort and engagement, such as building a community-university coalition or an in-depth spatial analysis of a particular issue. Unlike the university-based facilitator models described above, CG is sympathetic to the episodic and sporadic GIS needs of community partners, rather than being focused on particular projects that emphasize a single topic, class or grant. CG is also flexible about how and when community participation happens. Community partners participate when and how they feel it is appropriate. Similarly, the methodological approaches are flexible in CG. GIS is a commonly used tool but depending on the research priorities expressed by community partners, other research methods (both qualitative and quantitative) are drawn in as appropriate. The goals of the project and

the research questions inform the methods, not the other way around. There is a balance to be struck between technology access and the participatory process.

CG also emphasizes resourcefulness and strategic partnerships to mitigate access barriers and build spatial knowledge. Entrenched access barriers include the time, skill and financial investments necessary to develop in-house GIS expertise and to create new data. CG facilitates access to technological resources and expertise available at our universities on behalf of community partners. Students, staff and faculty directly engage with technologies when partners do not possess the capacity. Skill transference is not always a priority because of partners' constrained resources but is provided when appropriate. Instead, CG uses an iterative process so that community partners can provide substantive input on the research process and outputs without burdensome time, staff, technical and monetary investment. CG also facilitates strategic partnerships with appropriate university and governmental representatives that can inform both the process and outcomes of projects. Because CG addresses a wide range of community priorities, strategic partnerships with content experts may be necessary to realize project goals.

Meanwhile, sustained, meaningful relationships foster improved data sharing between community partners, as well as data access from third parties. Community geographers have been successful in facilitating data access, which

is enabled because community geographers demonstrate capacity to effectively manage, share and safeguard sensitive data. Inappropriate or nonexistent data can stymie PPGIS efforts because data creation is time and resource intensive. CG utilizes resourcefulness and strategic partnerships in order to address gaps in data availability and to act as a connector between community partners and the university helping them to leverage appropriate resources.

Facilitation of PPGIS by community geographers can be challenging. A primary challenge is how time consuming the establishment of trust in collaborations between the university and community organizations takes, often a year or more, making it difficult for a student or even a tenure seeking professor to cultivate new relationships and then carry out collaborative research projects within the time required to reach their specific career needs. This challenge is lessened by an institutionalized CG center or programme because trust can be built with the centre itself and its director and staff. Secondly, it is often difficult to evaluate the short and long-term impacts of community mapping projects. A map, a report, or an app may have value that is difficult to measure. This does not necessarily mean a project did not succeed, however. The process of community mapping projects, the links made between organizations or between an organization and the university may be more important than the tangible products of a project.

Institutional challenges are present at a variety of scales. One key challenge is that the ability to provide adequate facilitation/support is predicated on institutional support (e.g. capital and technology). University presidents and deans vary greatly in their support of community-based research and community outreach in general. State and federal support varies with budgets and political power. Available funding may also be affected by the size of the institution and whether it is public or private. The case studies discussed here include a large, private research university (Syracuse University), a regional public university (Columbus State University), and a smaller, predominately African-American serving public university (Chicago State University). Each has its own advantages and challenges. Syracuse University is the most focused on traditional research goals for tenure and promotion. Chicago State and Columbus State have fewer resources, but more flexibility for faculty. Chicago State has also been greatly affected by the state government financial crisis that has severely contracted the NAC to a quarter of the director's workload (from three quarters) and eliminated an administrative assistant position. A second institutional challenge involves inflexible teaching models and schedules that adhere to the academic calendar and the traditional classroom. A potential project might not fit well into a traditional class, either because of the size of the project, or because it develops students' knowledge and skills in ways that are more appropriate outside of the academic calendar and traditional classroom. Finally, community geographers, like other faculty and university staff, need to meet the expectations of our employers and departments. The products and impacts of CG projects are not always recognized in the tenure process (Robinson and Hawthorne, *in press*).

Additional challenges arise from the multiple roles faculty and student community geographers may play in community-based research. While community geographers are

often perceived as neutral, it may also be assumed that they represent the university and may be biased towards the positions of the university in the community. In addition, many community geographers are activists or community members in the community being studied. These diverse roles can create difficult political situations. Other worries are that researchers may be co-opted by one or the other side of a project, or asked to advocate one side of an issue. While in many cases this may be appropriate and even desirable, as community geographers become more involved with the community, the politics of the research become increasingly complex, and the geographer will heavily influence the interpretation and depiction of the landscape shown in the maps created (Barnes and Duncan, 1992). In such instances, the positions of scholars and community members blur.

CONCLUSION

Community geography offers one avenue to supporting the now 20-year-old vision of PPGIS by utilizing geospatial technologies to affect positive change within communities and promote social justice themes. In doing so, practitioners also recognize that those technologies cannot be shared without also developing meaningful relationships, knowledge and power sharing through the medium of facilitation.

While challenges exist, CG clearly has the potential to facilitate PPGIS projects and continue to create broader and more sustained access to GIS and other geospatial resources. The National Science Foundation, the Association of American Geographers, our own universities and many others are growing in their focus on broadening public participation in research as well as community engagement. Timothy Hawthorne has procured NSF funding for a CG Research Experiences for Undergraduates (REU) Site grant (NSF, 2016). In its nascent form, CG is demonstrating value by way of research opportunities, student experience, and community benefit. Despite the fact that it often falls outside the realm of traditional scholarship, institutions can continue to evolve in their goals through the support of CG.

In this regard, CG may also offer insights into a broader discussion around community-university partnerships. Many elements related to CG resonate with the 2012 call of the American Association of Colleges and Universities (AACU) for building community-university partnerships, particularly around service learning, where community organizations actively help decide the work that it done, the methods used, and the manner in which data and reports are disseminated (The National Task Force on Civic Learning and Democratic Engagement, 2012). CG should be further explored within this context.

BIOGRAPHICAL NOTES



Jonnell Robinson is an assistant professor of Geography in the Department of Geography at Syracuse University. Robinson is also the director of the Syracuse Community Geography programme which engages community and university stakeholders in participatory GIS projects. Dr. Robinson

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