[GS-02-06] Public Participation GIS

Abstract

Public participation geographic information science (PPGIS) has been presented as an alternative to the technocratic methods and tools of GIS. It draws on the generative knowledge practices which emerge when people are clustered together in relation to a decisionmaking practice by intentionally taking part in spatial activities related to the decision. This is a wide context, under which it is important for PPGIS practitioners to reflect on the concepts of “public” and “participation”, adapting their theoretical and practical frameworks to suit the goals and aims of each project. Instead of assuming that including publics will always lead to better quality and more just or democratic outcomes, researchers are encouraged to reflect on the broader geographic and political strategies of involving publics in their work, paying particular attention to building trust and acceptance of PPGIS amongst affected populations. Key to successful participatory GIS is a recognition that whilst everyone is expert in their own lives, conventional practices – including but not limited to those within the spatial sciences – have historically served to privilege specific types of knowledge claim at the expense of others, subjugating the kinds of experiential accounts of place and matter which high-quality PPGIS is able to generate.

Keywords: decision-making, public participation GIS

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Explanation

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1. Introduction

Most information used in policymaking comprises a spatial component known as geographic information (GI). GI could be connected to public health, environmental science, urban planning, or any number of other natural or social phenomena. Most decision making therefore benefits from the mediation of affected stakeholders with GI, principally by involving publics in its collection, analysis, visualisation, and disbursement. By adapting conventional methods to incorporate “non-expert” knowledges, publics are empowered to express satisfaction or objection, allowing the adjustment of plans to best suit a community. When based on geographic information systems (GIS), this is known as public participation GIS (PPGIS).

Although PPGIS originated earlier, stemming from European trade union movements like

many other participatory sciences, it was magnified intensely during the late 1980s and early 1990s. It took off during the cultural turn in human geography amidst growing attempts to democratise mapping and spatial analysis (Sieber, 2006). The decisionmaking body, for example governmental or commercial agents, was seeking to engage meaningfully with the body politic in new ways, intending to increase the authenticity of public engagement. Somehow involving publics became a requirement in planning, which transferred to science and research. Simultaneously, granting agencies like the National Science Foundation (NSF) began to require demonstration of things like “broader impact”, “building partnerships,” or “increasing inclusion”. In part, PPGIS emerged as one way for GI scientists to address growing concerns about the real-world impact of the investment in their research.

As such, like many publicly-engaging sciences, PPGIS came to rest on rationalist drivers for engagement. These were based on normative and assumed needs to educate and persuade different publics in the construction of social agreement. The emergent applications, such as using maps to gather views on the construction of nuclear power stations, or collecting volunteered location records to analyse mobilities on public transit, were successful and popular. Unavoidably, they relied on the intrinsic futility of one side (science) to engender trust through the management and control of the other’s (public) response (Owens, 2000). The underlying assumption that decisionmakers benefit by including geographic information (GI) generated by the public was evidently not sufficient to guarantee the production of good quality science.

Of greater relevance for PPGIS was public engagement led by a civic rationale (ibid.). This aimed for democratic participation, and demanded critique of the assumptions underpinning scientific, political, and social decisionmaking. It became important to critique the assertion that all PPGIS fundamentally promoted democracy, especially where an inquiry was set to produce the same results as conventional GIS. Before broadly stating that their research is legitimising new lines of unconventional or non-expert knowledges, it is crucial for PPGIS scholars to first examine how GIS has come to interact and juxtapose with the lives and experiences of their study population. This approach initiates discussion of what PPGIS is trying to achieve and how to effect it. Without sophisticated thinking, public participatory research design is unlikely to lead to equal satisfaction between stakeholders.

Like the technologies under consideration, the thinking itself was developing at tremendous speed. The developments are summarised by Goodchild (1992) and Pickles (1999) in their works on the GIS Wars. These were conceptual debates within GIS as well as more broadly in geography itself, which revolved around the central tension between GIS as a software-based tool as opposed to its recognition as a scientific field with its own methodological and political positions. Elwood (2006) expanded on this in the participatory context, evaluating the widening of GIS as a social practice. Her work describes a “reconstruction” of the scientific practice, responding to the deconstruction in the critical texts of the cultural turn.

Just as the intuitive and visual materials created by GIS opened up scientific knowledge to scrutiny from many different actors, this topic examines how participation and public – the two principal components of the PP- prefix – have introduced two important epistemological contexts which social scientists continue to grapple with. Addressing these concepts thoroughly will lead to significant methodological advances within the discipline.

2. What is the Nature of Participation?

The origins of PPGIS lie in participatory action res research and deliberative democracy. The former, with its origins in European trade unionism, were formalised by Lewin in the mid C20th, when he observed “taking action” and “doing research” coalesced in participative management at a textile factory in Virginia (Kristiansen and Bloch-Poulsen, 2017). The latter was a codified Habermasian tradition of politics and philosophy, which argued that only a period of authentic deliberation could precede legitimacy in decisionmaking (Braun and Whatmore, 2010).

From these grounds, the key lessons for PPGIS practitioners are that problem solving is best implemented within a collaborative context, and that any individual or institution might be able to take part in introducing and challenging knowledge claims. This is clear within the example of environmental decisionmaking in the US. The interwoven assemblage of political authorities (e.g., the federal government, state and county departments, international conventions), environmental bodies (e.g., EPA, USGS, NOAA, USDA, NASA), other impacting agencies (e.g., USDOT, Amtrak, National Park Service), and private businesses (e.g., landowners, developers, agribusinesses, energy companies), demonstrate a multi-level, multi-sited polycentrism. Even then, the imagination of science informing policy informing public is interrupted at every stage by the lively agency of affected people and stakeholders.

Questions of space are relatively straightforward to respond to in GIS: Where are outbreaks occurring? or What is the spatial relationship between socioeconomics and demographics? have defined answers. Questions related to place however: How are people interacting with this space? or How do people feel in response to these spatial phenomena? are characterised by unpredictability and uncertainty. This is why it is difficult for academics and researchers to accurately predict the impression, uptake, or impact which their work may have. PPGIS methods excel in the identification and interrogation of such social and cultural landscapes, serving as a platform for translating knowledge claims between parties. Two particularly notable platforms in this regard are from British geographer Huck: the Map-Me (Huck et al., 2019) spraycan for the collection of vague spatial data; and Paper2GIS (Denwood et al., 2023) which produces accessible and material GI without computers.

PPGIS has thankfully moved away from its early associations with top-down decision making and the explaining away of limited public acceptance of research outcomes. As a heuristic device for classifying participatory methods, it is useful to consider the eight “rungs” of Arnstein’s (1969) ladder of citizen participation, as follows:

8. Citizen control

7. Delegated power

6. Partnerships

5. Placation

4. Consultation

3. Informing

2. Therapy

1. Manipulation

Of the types of PPGIS already mentioned, many rest on the fourth step, consultation. A large number of contemporary research projects have designated themselves as partnerships (e.g., community-based research), often inaccurately so, as this rung requires that the participants themselves have informed the research design. Geospatial technologies are able to assist in facilitating participation on every rung, including the top, wherein communities have begun to adopt PPGIS techniques as responses to injustice or under acknowledgement. A good example of this is the Anti-Eviction Mapping Project (Maharawal and McElroy, 2017), a multimedia collective documenting dispossession and resistance in San Francisco and Los Angeles.

The hierarchical nature of Arnstein's ladder intimates that the higher rungs are favoured over the lower. This is a misled presumption. Instead, it is helpful for PPGIS practitioners to opt for the most appropriate level based on the context and objective of their work, the capacity of involved stakeholders, the scale (e.g., from local to global), and the core nature of the problem. Ultimately, the level of participation depends on the degree to which publics are willing to defer to the judgments of researchers in the policy process, as well as vice versa, and of course the practicalities of doing so in either case. This is all critical when determining the extent to which truly co-produced knowledge has amounted following any mode of GI-engagement. The term co-production is banded around by some participation scholars almost loosely, but was defined appositely for PPGIS by Callon (1999), who described it as the outcome of transdisciplinary ambitions for society and its institutions to mutually shape knowledge production, and a product of scientists and publics engaging each other generatively in relation to a shared concern.

Neither the ladder nor co-production are objective measuring sticks by which to determine the success of PPGIS. Rather, they serve as examples of interpretive devices employed widely in other participatory research which can be employed at each stage of PPGIS research design.

3. Who Are the Participants?

Good PPGIS practitioners carefully acknowledge the domain of "public" as carefully as "participation". The question of who to involve is a key element with clear linkages to the types of goals and outcomes which a PPGIS project might hope to fulfil, similar to critiquing the notions of who a "citizen" is and how they might be determined within the disciplinary cognate "citizen sciences."

There is a conceptual continuum. On one end is a narrowly focussed, well-defined public, on the other is an amorphous and ill-defined public. This could range spatially from a clearly identifiable group selected by personal closeness to an issue, within a catchment area for instance, or a distal unconnected public less-than-tangentially connected, selected for a purpose entirely different than proximity. A critical question emerges in the definition, which will determine what PPGIS can achieve: who are the decisionmakers in this place? These could be elected officials defined by legal power and political legitimacy, or a set of neighbourhood leaders defined by their relevance and sense of urgency surrounding an

issue.

This is to say that there is no “general” public. Schlossberg and Shuford (2005) charted a useful schema to parameterise the question of “who?” in three parts, those who:

1. are affected by a decision
2. can bring important knowledge to a decision
3. have power to influence and/or affect implementation of a decision

Overarchingly, publics are constituted dependent on context and place. A best practice would be to begin from an understanding that everyone is expert in their own lives. This expertise usually encompasses the geographies with which any public is familiar, so PPGIS scholars may ask: what lives does the enquiry impact, and how are they connected to the spaces within which decisions are sited?

This becomes especially important when dealing with marginalized or vulnerable publics. Commonly called “hard to reach,” they may just as easily be renamed “easy to ignore.” In their design, PPGIS platforms ought to account for a diverse range of worldviews, cultural backgrounds, and knowledge bases. This requires they be utilitarian and comprehensive enough to accommodate the breadth of the public who will encounter them, including an account of the “digital divide” – the gap between populations who have access to and can effectively use modern information technology and those who cannot. Users might not always be familiar with interfaces like Google Maps or Open Street Map, may lack suitable language skills, or might not have access to computers with reliable internet connections at all, especially in remote rural areas in the global south. This issue can also affect low-income or minority ethnic populations in many cities in the global north, which are of increasing interest to decisionmakers with accelerated urbanisation. Overemphasizing digital literacy in such places could result in a false authority of PPGIS research.

Effective PPGIS research requires more than just deciding whether to include the public. It would be beneficial for projects to define the specific type of public they intend to engage, tailoring this choice to the desired outcomes as part of a public process.

4. Best Practices

Thoughtfully conceived PPGIS steers clear of marginalisation and continued oppression enacted by the production and maintenance of the same institutions and structures which it intends to transform. Hodgson and Schroder (2002) outlined an early example of this in Masai, Tanzania, where outside researchers had gathered to clarify village boundaries. High precision visualisations induced injustice through the division of land and territory into bounded areas, and the drive for systemisation built on the scientific labour of the participants bulldozed the spatial and societal norms agreed upon since many generations prior.

PPGIS cannot be implemented in a void. The best practitioners consider the ownership and structuring of spaces by those who provide them, including as bound up in the historical legacies of cartography and colony. Participants’ experiences and knowledge of space and place determine the results of the exercises in knowledge production, and the extent to which the PPGIS is accepted within a community.

“Knowledges” in the plural is another useful epistemological device. PPGIS works well when

incorporating experiences and situated perspectives on the same digital platforms as traditional geographic space (i.e., a GIS), inherently questioning and challenging the conventional notions of expertise by removing the dichotomy of “expert” and “lay”. The uptake of co-produced knowledge through the new division of labour between [GIS] practitioner and public has important consequences for science – the stabilisation of useable and useful participatory methods and technique, value for research legitimacy – just as it does for political decisionmaking – new practices which change power relations and introduce uncertainty, a disturbance in the continuity of institutional, governmental, and political inertial forces.

A base aim for PPGIS would be to organise and present information which was neither previously unavailable nor well-translated between stakeholders. This would enable groups to harness GI and spatial technology for more deliberative decisionmaking, flattening the hierarchy of “expert” knowledge claims. Also, carefully designed and implemented platforms counter the dominance of elite academics and technical expertise in the spatial sciences, reconfiguring preexisting understandings of space.

Considering these best practices as a baseline serves a prudent counter to the inclusion of participants for participation’s sake. This inheres attention to the issues of access, power relations, and diverse knowledge claims as the critiques of conventional GIS which Elwood (2006) identified as fostering the rationale for PPGIS in the first place. To do so is to overcome the assumption that all PPGIS efforts are definitionally inclusive, aware of the problems of access and disempowerment, and conscious of their own production of inequitable networks of geographic knowledge production.

5. Conclusion

GIS is a viable footing upon which to build strong and meaningful public participation. Practitioners and scholars of PPGIS are guided to decide what constitutes meaningful participation within the framework of their investigation, and what constitutes an affected public. As way of a final suggestion, “participation” and “public” can extend outward from the conventional distinction of a “lay” population to include elected officials, research scientists, and indeed the GIS practitioners themselves. The same rigorous theory, when applied in recognising these groups of people as stakeholders within decision making processes, remains attentive to the ways in which they affect and are affected by the work. At the heart of this issue is a question of whose knowledges count. For PPGIS, which deals with everyday issues in people’s lives, participants must be treated as unique individuals with specific roles to play, rather than positionless generators of impersonal geographic information.

The conjunction of PP with GIS is a laborious but abundant endeavour. Inclusion is not unto itself an adequate goal. When certain perspectives are included and others excluded, the existing power structures which have run rampant throughout the histories of geography and mapping reify themselves through the work meant to address them. Giving the “public participation” prefix to GIS without a present consciousness of the domain within which it takes place pays a disingenuous service to the scholars seeking to democratise science and generate meaningful solutions to the world’s problems.

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