The potential of public participation GIS in UK environmental planning: appraisals by active publics.

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ABSTRACT

The paper draws on an empirical study of two workshops in which the issues that arise from the use of GIS as a planning tool in public participation settings where explored by local residents who take an active interest in local planning matters in their London borough. The paper demonstrates how issues concerned with the democratisation of GIS and Public Participation GIS (PPGIS) informed the structure and conduct of the workshops and the qualitative analysis of the workshop discussions. Key themes raised by participants include the potential of PPGIS as a means of extending knowledge networks; issues of data ownership and the responsiveness of data providers to public concerns, and the role that institutional norms and practices play in democratising information availability and the transparency of the decision-making process. The paper concludes that the potential of PPGIS as a planning tool cannot be separated from public concerns about the legitimacy of the planning process or local government.

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Introduction

Public Participation GIS or PPGIS has a broad research agenda that seeks to encourage new layers of capability within GIS and new connections to technologies and processes outside present GIS practice (Schroeder 1997, Obermeyer 1998, Talen 1999). This goal includes the use of GIS by grassroots communities to improve their purchase on public debate about future developments, the drive to increase public participation in environmental decision-making and improvements in the GIS tool kit for such purposes. These concerns sit within a wider research agenda about the democratisation of GIS in which the community is regarded as in need of more and better information and GIS technology itself in need of developing a pluralistic approach that supports both conventional (government generated) and non-conventional (community generated) data types.

Within the UK, the increasing availability of GIS in central and local government – especially within the planning departments, combined with the Labour government's stance on increased public participation in decision making processes (DETR 1998a, 1998b), provide the motivation and framing for PPGIS research. In the context of physical or land-use planning, central government expects all local authorities to provide Internet-based Planning Services by 2005 (DETR 2001) and a GIS is likely to be part of these services. At the same time, anticipated changes in the local planning system are likely to open new opportunities for PPGIS to be used by planners and the public in the preparation of proposed Local Development Frameworks, Community Plans and neighbourhood plans (DTLR 2001, 2002). The GIS research community in the UK has responded to these drivers by focusing on the development of novel approaches and an emphasis on Internet-based applications (Doyle *et al* 1998, Kingston *et al* 2000, Hudson-Smith and Evens 2002, Horita 2000, Carver *et al* 2001, Reeve *et al* 2002). These projects have adopted a mainly technical and technology-optimistic approach, paying attention to societal issues such as constraints on access to computers and the Internet, and in some cases using the technology as a way of reaching new publics and groups that do not participate in planning process. Their conclusions are usually supportive of policies designed to promote the wider use of Internet-based GIS for public participation in decision-making. While the rapid development and promotion of new technologies is undeniable, other related research in the planning field in the UK (Davies 2001, Rydin & Pennington 2000) suggests a more cautious approach before public use of GIS is to become common place in the planning process. In particular, studies point to the need to better understand the ways in which those publics already engaged in the planning process can benefit from the use of GIS. For example, researchers such as Davis (2001), Lowndes *et al*. (2001) and Bedford *et al*. (in press) reveal those constraints on participation in local decision making involve more then overcoming technical barriers. Lack of awareness, scepticism and suspicion about the efficacy of participation, as well as lack of trust in local government, all influence public attitudes towards active

engagement with the planning system. Even within currently participating publics, there is a high degree of alienation and disbelief in the impact of participation on the decision outcomes. Thus, while some studies show that people who are actively involved locally often serve as community innovators and motivators (Schroeder 1997; Selman & Parker 1997, Sieber 2000a), other studies suggest that these publics are likely to be sceptical about the promise of 'more participation' offered by access to GIS. Research which focuses on the experiences of these active publics with new GIS technologies may therefore provide a means of assessing how conventional and new barriers to public participation in environmental planning might be addressed together.

Against the background of the broad agenda of PPGIS, the changing policy terrain of local planning in the UK and the current practice of participation, it is helpful to critically examine public attitudes to GIS as a planning tool. In this contribution we report on an experimental study that focuses on how active publics in one London borough respond to experience with a GIS designed as a planning tool. Once-only sessions (carried out during August 1999 and February 2000) provided opportunities to explore public response to a number of interactive facilities and data sources, as well as opportunities to add their own information to the system. Our overall purpose was to use participants' experiences with an interactive GIS as a means of assessing their attitudes towards the wider use of this technology as a means of providing access to planning information, for evaluating what kind of information the public found useful, and for generating ideas about what information and analyses they would like to add to the system.

First we review key issues associated with the development and use of PPGIS and demonstrate how these concerns shaped the design and conduct of two public workshops that form the empirical study. Second we review the findings of the two workshops by drawing on participants' experiences of using a PPGIS and conclude by identifying key issues this study raises for the potential of PPGIS as a planning tool within the British planning system and future research directions.

PPGIS and the development of the study

In this section, we explore the main elements from the wider PPGIS literature that influenced the design and development of the study methodology and conduct. The review here focuses on those aspects of GIS relevant for contextualising our London-based study and informed by the wider literature on PPGIS, including special issues of journals (Obermeyer 1998; Carver 2001), books (Pickles 1995; Craig *et al* 2002; Jankowski & Nyerges 2001) and web sites of specialist meetings (NCGIA 1998). We focus on three themes namely: the expected functionality of a GIS in order to serve participatory settings; the type of social and institutional interaction and collaboration that is anticipated when using the GIS; and key theoretical themes that should guide the analyses of PPGIS experiences.

One of the driving forces of the PPGIS research agenda is the belief that the public needs access to more and better information if GIS is to empower local communities (Elwood & Leitner 1998, Harris & Weiner 1998; Talen 1999). A major concern therefore is the need to provide interactive systems that permit users to manipulate data in ways they feel are meaningful and which permit community–

generated information to be added to more conventional data. Talen (1999) for example, suggests that a fully interactive GIS would permit users to view conventional information based on government information, to alter the scale of data, to explore multi-media links that visualise data as tables, pictures and virtual realties, and to add layers of information generated by local people. Shiffer (1995a, 1995b) for example, suggests that this kind of integration is useful in environmental planning settings.

A second objective of PPGIS is to facilitate a more interactive and collaborative approach to planning in which local people and members of the local authority, developers and local councillors meet together to discuss development proposals (Harris & Weiner 1998, Healey 1997). In the UK, opportunities for members of the public to come together to discuss local development proposals with local authority officers and councillors are limited. Instead, formal public opposition to proposed developments has to take a written form that precludes open and wide debate. Moreover, where formal public meetings are convened by the local authority these often have a quasi-legal structure that encourages adversarial exchanges rather than constructive debate (Davis 2001). More recently however, new public 'spaces' have been opened up through Local Agenda 21 activities (Young 2000) and new consultation arenas such as 'area forums' associated with the Labour Government's Modernising Local Government arrangements are being promoted (DETR 1998a; Wilson 1999). In these more collaborative forums PPGIS can potentially serve as a 'community resource' that can both generate and support constructive debate by drawing on its visualisation and communicative capabilities (Al-Kodmany 2002; Krygier 2002).

A final concern relates to the need to ground the development of PPGIS as a planning tool in people's experiences of both the planning system and IT as a whole – much as critical GIS theorists have advocated (Curry 1998; Pickles 1995). In this regard we recognise that different user groups are likely to have different needs and that wider social attitudes are likely to impinge often in quite subtle ways on public attitudes to the potential use of PPGIS as a planning tool. Although the first phase of PPGIS research during the 1990s focused to a large extent on the technical challenges of these systems (Craig *et al*, 2002b), and studies are now expanding into areas that deal with contextualised and issue based studies (see Ghose & Huxhold, 2001), there is a need to develop more theoretically informed empirical studies that explore how wider social attitudes impinge on the potential uptake of GIS within public participation settings.

Study methodology – the design of the workshops

An interdisciplinary team, brought together through a research initiative of the Graduate School of the university, included researchers with experience in GIS, participatory planning and environmental management who carried out the design of the first workshop. Several planning meetings discussed the possible structure, content and goals of the first experimental workshop and a subsequent research project, funded from external sources, which included a second workshop that built on lessons learned from this first workshop. Both workshops were envisaged as once only events in which the focus was on how participants understand, use and discuss the information held in the GIS, and reflect on their experiences in relation to the planning system. Given the team's cross-disciplinary experience in deliberative approaches to planning, we adopted a

qualitative methodology to explore the relevance of PPGIS within the context of the 'communicative turn' in planning theory (Healey 1997). While accepting that the concept of collaborative planning is not without its own problems (Tewdwr-Jones & Allmeinder 1998), it seemed relevant to explore how situated knowledges that are addressed in a collaborative planning approach are also mobilised through the use of PPGIS. This framing influenced decisions on recruitment, the structure and conduct of the workshop and our approach to analysis. In terms of recruitment, we decided to recruit people with some experience of the local planning system, so that participants could compare their existing experiences of the planning system with their GIS experience. To this end we recruited workshop participants from two distinctive publics. In the first workshop participants were active members of local amenity and environmental organisations with wide experience of the local planning system. In contrast, participants in the second workshop were recruited in their individual capacity as 'interested' but not organised members of the public. Each of these participants had objected to a local planning application in the last twelve months. Limited resources dictated that we were only able to recruit a small number of people to each workshop and participants were hence 'typical', rather than representative of each of these two active publics.

Both workshops were held in Wandsworth, an inner London borough. This borough is one of the most innovative local authorities in the UK in terms of use of Information and Communication Technologies (ICT) for its planning system, and has been selected as a 'pathfinder' under central government's E-Government initiative (DETR 2001). These ICT initiatives by the local authority increased the likelihood that potential participants in the workshops might have some experience with ICT in planning context. The workshops were convened in educational facilities designed to encourage group learning and provided as part of these wider ICT initiatives. The first workshop was held in a purpose-built university facility and the second in a public facility – a City Learning Centre that was located in the London borough of Wandsworth. In both workshops trained facilitators worked alongside participants to help them navigate their way around the system and to answer questions. In this way even those who used computers for the first time were able to gain some experience of the system's basic capabilities and more competent participants could take time to explore the full range of interactive facilities such as multi-media links. The 'chauffeurs' were researchers and graduate students familiar with GIS, the content of the specific system and aims of the workshop. This approach was based on experience in Computer Supported Co-operative Work (CSCW) studies (Nunamaker *et al.* 1991) and other Participatory GIS studies (see Shiffer 1995a, 1995b, Jankowski & Nyerges, 2001).

Each workshop was structured in three parts - an introductory plenary session, a practical 'hands-on' session and a focus group discussion. The introductory session outlined the basic features of the GIS (adding and removing data layers, zoom operations and explanation about the analytical capabilities of the technology) and the various data sets that are available in the system were displayed using a data projector. The presentation followed a written script. In the second session participants worked around a freestanding PC in groups of two or three together with a GIS facilitator. The facilitators first demonstrated some of the basic tasks during the hands-on session and then encouraged participants to take control of the mouse and keyboard and to navigate their own way through basic operations of the system. The facilitator answered questions, and

offered advice throughout these basic tasks. Simple tasks involved exploring each data set (see below), undertaking overlays, simple panning and scale changes, and visits to external web sites linked to the data layers. Towards the end of this session, the issue of adding information to the system was raised and participants were able to explore the ability of the system to store their own information. This 'hands on' session lasted for 90 minutes. It was followed by a break for refreshments and an hour-long focus group discussion moderated by a member of the research team with experience in group facilitation. Some of the technical facilitators from the 'hands-on' session joined these discussions. The discussion was structured around a few major themes namely: impressions from the workshop, relevance to the participants' experience with the planning system and other concerns that were raised during the hands-on session. At the end of the workshops participants were invited to fill in a feedback form. It is noteworthy that in their feedbacks, most of the participants expressed enjoyment from the process and encouraged the local authority to use similar system in the future.

Software and database compilation

In the study we developed an interactive GIS similar to that likely to be provided by the most innovatory of public planning systems. This purpose built facility used the capabilities of modern desktop GIS (ESRI's Arcview) to provide access to conventional government and local authority data and offered multimedia links to specially designed web pages or existing web sites. Connections were provided through links to various geographical features of the database, for example to nature conservation areas or specific brownfield sites. Such an approach enabled the seamless integration of multimedia files using the web interface in a way that participants who are familiar with the web could use easily.

Land use and spatial planning information formed the focus of the database. These data were derived from various sources, including environmental information provided by the Environment Agency, information on the local statutory plan – the Unitary Development Plan (UDP) - provided by the local authority, and digital data from the Ordnance Survey (OS). For a full discussion on the GIS database construction see Boott *et al.* (2001). The data were stored under five headings: green/natural environment data provided by the London Ecology Unit (LEU) and the Environment Agency; population and socio-economic data derived from the census; brownfield data based on maps associated with the UDP and the Wandle Valley Regeneration Partnership. For the second workshop we added information from the National Land-Use Database (NLUD) which contains information about brownfield sites and was not available at the time of the first workshop. Finally service area analysis was used to demonstrate the capacity of GIS to carry out various spatial analyses quickly and easily. This information was displayed as distance from amenities such as a park, and road network analysis based on distance from public transport nodes.

The second workshop drew on feedback from participants who had taken part in the first workshop. Based on their suggestions two historical data sources were included: aerial photographs of one brownfield site flown in 1994 and 1999, and a series of scanned historical maps of the region with OS maps from 1969,1952,1919,1891 and 1862. In

addition we included a projected layout and elevation of a proposed development for one brownfield site provided by architects working for the developers.

Recruitment of participants

We recruited fourteen people for the first workshop, and all respondents were active members of a community or voluntary group in the borough of Wandsworth. Participants were recruited using the 'snowball method' (Burgess 1984). This involved contacting a number of groups already known to the research team and the local authority (22 groups were contacted). Once a contact person had been recruited, s/he was asked to put us in touch with other people who might be interested. We outlined the purpose of the workshop to all potential participants and if they responded positively likely participants were given a one-page outline explaining the project, an agenda for the workshop, and a GIS screenshot. A follow-up telephone call was made a week to a fortnight later to confirm attendance.

For the second workshop, we recruited participants from a public list of 82 people who had objected to a planning application in the borough during the last twelve months. Participants were invited to the workshop by letter and 19 people replied to say that they would like to attend. A follow-up phone call was made in the week preceding the workshop to confirm likely attendance. Ten respondents could not attend on the day because of prior commitments. None of the 9 participants knew one another.

Tables 1 and 2 illustrate the composition of each workshop by gender, age, and self-assessed computer literacy. In terms of computer literacy participants varied from the novice to the expert and only one participant had some experience with GIS. In the recruitment material and when talking with potential participants, we emphasised that no prior experience with computers is necessary, and in both workshop we had one hands-on group in which we started with an explanation about how to operate the computer's mouse. All respondents were white and predominantly middle class. In this regard participants were typical of those 'active publics' other studies of public participation in planning have recorded (Thomas 1996; Rydin & Pennington 2000). The social composition of participants in this study might seem inconsistent with addressing one of the main goals of PPGIS agenda, that of increasing access to marginalized social groups (Weiner *et al*. 2002). However, we contend that in the British case, even those publics who already participate in the planning process believe themselves to be marginalized and disempowered by existing planning structures and practices (Davis 2001; Lowndes *et al.* 2001; Bedford *et al* in press). Moreover, it is clear that in the UK, GIS technology has not penetrated many Non-Governmental Organisations (NGOs) due, in part, to copyright issues (Pipes & Maguie 1997). In terms of their own self-assessment, participants in the two workshop believed themselves to 'marginalized' both by their experience of the planning system and their lack of experience of public GIS. As Obermeyer (1998) noted, "the use of GIS can make it difficult for average citizen to participate in ongoing policy debate" (p. 65), but it is equally clear the concept of 'the average citizen' can also constrain the policy debate. By adopting a more theoretically informed understanding of the 'marginalized publics' who might be expected to engage with PPGIS, our study seeks to contribute to one of the most important goals of the PPGIS agenda.

In terms of data collection and analysis, we adopted a qualitative approach to exploring public attitudes to GIS as a planning tool (Gottsegen 1998). With the

permission of participants we recorded discussions that took place during the workshops and recorded all the interaction with the computer using software tools (Lotus ScreenCam). This involved recording discussions between pairs of participants and the facilitators who assisted them during their hands on use of the GIS, and recording focus group discussions held towards the end of the each workshop. Three focus groups were moderated by trained facilitators and provided an opportunity for a group of seven-nine participants to discuss their experiences together. The transcripts of the hands-on discussions and the focus groups provide the 'narratives' through which issues of representation, power relations, legitimacy, ownership and social practice are given voice (Curry 1998). In this way our analysis is grounded in the experiences of participants and provides a means of reviewing the legitimacy and saliency of issues raised by more theoretical perspectives on GIS and society as well as of exploring new concerns that matter to different publics. Through a focus on the lines of argumentation participants use to assess the potential of GIS as a planning tool our analysis provides for a deeper understanding of social concerns than conventional evaluations based on questionnaires for example, can provide (Silverman 1993)

Workshop findings

In identifying key themes raised in the discussion we employ a qualitative approach to discourse analysis that focuses on the common arguments, agreements and counter views expressed by participants in both workshops. Analysis followed the conventions of qualitative research outlined by Silverman (1993) that involved a process of reading and re-reading transcripts and coding using codes emergent from the text and externally generated codes suggested by key themes in the PPGIS literature. For the sake of simplicity we draw on the transcripts of the focus group discussions held towards the end of each workshop during which discussion centred on the advantages and disadvantages of GIS as a planning tool. The key themes we report on are those raised by all three focus groups and are 'triangulated' by the evidence from the detailed discussions held between pairs of participants and their facilitator during the hands-on session of each workshop. Contributions from the first and second workshops are denoted as W1 and W2. Three themes are discussed: deepening and extending knowledge networks, data providers and 'getting behind the screen', and institutional practices, norms and issues of trust.

These three themes emerged repeatedly throughout the hands on session and the focus groups and they hold a special relevance within PPGIS context. First, the ability to access information and to build knowledge about the planning processes was recognised in the PPGIS literature early on, and is one of the pivotal elements of "democratization of data" (Sawicki & Craig 1996; Pickles 1995; Harris & Weiner 1998). In the following analysis, we focus on situated knowledge and demonstrate the social and institutional context in which data democratisation takes place. Second, a core concern in PPGIS research is to find new ways to integrate local knowledge and information into GIS (Talen 2000; Curry 1998; Pickles 1995). During the study, we explored what information participants would like to integrate into the GIS, and provided an opportunity to experiment with the process of entering data. Discussion around these practical issues evolved into questions about data control and wider power relationships in society.

Finally, issues of trust and institutional practice were raised in the context of local people's desire to engage with a more participative approach to planning. Consistent with the strong advocacy of 'community integrated GIS' in the PPGIS literature (Harris & Weiner 1998; Talen 1999, 2000) these discussions serve to reinforce how the differing institutional structures of planning in the UK and the US (Cullingworth 1993), undercut public attitudes to PPGIS. Coupled with calls for a participatory turn in British governance (Lowndes *et al.* 2001; Wilson 1999; Bedford *et al* in press) these discussions also serve to demonstrate how public attitudes to the introduction of new technology are embedded in existing social relations.

Deepening and extending knowledge networks.

The potential benefits of GIS as a capacity raising tool through its ability to display information in a variety of ways underpinned much of the discussion in both workshops. For example, in talking about how the GIS might be used by local groups participants in the first workshop believed that GIS could extend existing knowledge in new and imaginative ways and in ways that had collective benefits:

> Elaine: "When we talk about the residents' associations, what one residents' association might say about parking affects everybody else. Where we live we have a flow through of commuting traffic, so you've then got to examine the issues of - if you stop them, are you going to overflow the trains? Or the car parks? Or whatever… we can see it mushrooming and it would be quite useful for us. … [the parking and traffic planning] is an enormous project and if we are all interacting, you get better relations".
>
> Judy: "You also get better understanding of the sort of investigation the council is doing and it makes more sense to you".
>
> Elaine: "And then you know advice about certain bus routes, for example. We've got trains … but the bus routes are rather lacking and that's another reason that causes traffic flow in our area because there are no buses and you can't get your kids to school by walking because it is too far. You can imagine there is lots of traffic which would be better served by little community bus … you get an overview of what everybody else's problems are". (W1)

In this exchange the women illustrate how GIS appears to offer new ways of addressing a collective problem - 'traffic congestion', that is often reproduced as a Not In My Back Yard (NIMBY) issue or subject to 'interest-capture' in formal public debates (Rydin & Pennington 2000). A GIS based on official traffic studies but supplemented with information contributed by local people and which integrates the spatial effects of local road closure or parking restrictions on other neighbourhoods or transport services throughout the borough, is thought capable of overcoming some of these NIMBY problems. Within PPGIS literature, this ability is linked to issues of "group decision making" and participatory processes (Jankoowski & Nyerges 2001). Likewise, the imaginative and creative potential of GIS in providing new knowledge is what excites James' in the first workshop, while he examine the service areas of mass transport links:

> "It's interesting, it does make you think… I was intrigued. If you share your views about the railway stations and the tube stations - it does give you sort of new dimension about how you think about the places in which you live. And perhaps it will encourage people, of all kinds, to rethink about their environment and where they are and what they do and how they can do it. Because that's what this sort of layered maps begin to reveal in a more thematic way than the old traditional printed map. … The printed map is very, very good … but this made me think 'Hang on, it is very interesting about where you can get to from Wandsworth by using public transport'. Which make people realise, made me realise that perhaps we should encourage more people to think about their transport options and therefore lead to less pollution, less congestion and so on. … and this kind of layered approach can make people rethink a little bit what their options may be". (W1)

Participants were also aware of the analytical capacity of GIS. For example, they wanted to be able to explore the cumulative impacts of traffic generated by several residential developments that had been permitted on the riverside. This is a form of strategic and technical assessment that is normally undertaken by planners themselves and often regarded as a technical process too complex for the public to comprehend. But participants argue that it could be opened up to local residents through ICT facilities. Being able to see 'the whole picture' was important.

> Peter: "What the GIS was great at was allowing you to see your entire environment because before you had to search for a planning application and that was just a document. With this, with the different overlays and the different systems, you could look up your environment and see what was happening as a whole" (W2)

This integrative ability of the system is augmented by a belief that the ability of the GIS to work in a more speculative and exploratory way was likely to be its most important function. As someone who worked with local community groups Paul saw these opportunities as critical:

> "... I felt strongly, having given many presentations to the community group, I wish I had the competence to use this tool for two reasons. One, it offered, it engendered in my view an enormous amount of discussion and things that I have not considered." [As an example he drew on their discussion of walking distance from transport nodes] "We were looking at Putney, it was incredibly revealing. That sort of information, I can't think of anywhere else that you can possibly get. The speed of access to this sort of information - I found it absolutely fascinating".
>
> Anon: "There is a creativity about this, that otherwise you wouldn't encounter"
>
> Paul: "Absolutely". (W1)

This exchange demonstrates that even the basic analysis of service areas, when presented and positioned with other information that can be easily combined and compared with it, provides a grounding for new ideas about the local area. The next step

up in the analytical capabilities identified by participants is the ability to explore 'what-if' scenarios. Although aware of the risk of information overload associated with new technologies, Martin summarises the potential use of the GIS as follows:

> "I think that there is such thing as information overload, but I think that if I had the choice, and I wanted to get more people engaged, I would be moving from information which is practically one dimensional, to 'what-if' type engagement. I personally have a bit of techno-fear and I would need a huge glossary to get through what we were shown this morning, but I think that even me could get to grips with it, and anyway future generation definitely will. But you could get endless amount of information from all of this, and you can get completely overloaded so it's something different that you need from that. I think that what-if might be a good entry into it." (W1)

These imaginative and creative uses of GIS portraying familiar problems in a new light and provoking new questions, underpin much of the discussion in both workshops. Equally, participants are aware of the changing nature of social interaction associated with ICT. Although the new technology does not promote social interaction in the same way that face-to-face discussions permit, participants viewed the GIS and its capabilities as an important extension of their social and intelligence networks. In both workshops, it was suggested that such a system should be use to alert interested participants about public meetings in their vicinity, or on topics that are relevant for them[1]. Several respondents see the GIS as a kind of 'information hub' that could have wide community uses. But in speculating about how useful such systems might be, people also placed emphasis on the fact that any facility should provide for two-way communication between the individual and the planning department. They wanted feedback – more like being able to receive a response to a query by telephone. For example, when working with the council's web-site that provide access to planning applications and an e-mail facility for sending objections and comments to the planning department, some participants wanted to know what other people had written. Knowing what other people had objected to would serve to strengthen the basis of their own objections. In other words, two-way communication would lead to a deepening of knowledge amongst individuals and groups and perhaps a better understanding by the local authority of public concerns.

In the same way, regardless of computer literacy, participants in both workshops agreed unanimously that any system must be Internet based and not a freestanding facility. Some people had experimented with the Council's existing computerised planning system and had encountered technical difficulties, including long download times, non-standard file formats and a complex search facility that was difficult to use. As

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[1] The local authority accepted this proposition, and in its new system a "my community" function will be integrated to provide this service. The new system will be available from Spring 2002.

a result people now avoided using it. Having a GIS facility linked to a system of planning applications that was Internet based seemed essential.

> Alice: "I think it is important that the Council do consider putting it on-line. As well, perhaps allowing people to switch bits of it off. If you want to use the system with photos, click here; if you want to use it without - here; because the speed is important obviously. I would not be able to access the GIS if it wasn't on-line. It would be extremely difficult for me."(W2)

These discussions suggest a clear decision support role for a PPGIS based on the visualisation and analytical capabilities of the system, much as Jankowski & Nyerges (2001) envisage. Confirming the findings of other studies that have explored the benefits of Internet technologies, such as those of Kingston *et al* (2000) and Shiffer (1995a, 1995b), participants also give strong support to the development of these technologies in a planning context. At the same time however, participants are aware that social practices and the social contexts in which GIS are used will have a strong influence on the communicative abilities attributed to these systems.

Data providers and 'getting behind the screen'.

As a means of extending knowledge of the planning process within and beyond their own networks, the key for local activists in the first workshop lies in what kind of information is displayed and who controls it. Local activists are keen that the data base should be supplemented with information local people themselves generate.

> Brian: "This does raise an important point for local groups. Who is in control of this information and I'm sure local groups would want to be able to put their own information on this as well as that coming from the landowner and developer and the Local Authority. We would want to know how to do that, which is getting behind the screen in a sense." … Martin explains that he knows of "local communities who would not trust their local authority and certainly not the developer…it needs much more emphasis on what's available for the local community". (W1)

To follow this suggestion of adding information, one of the facilitators asked Martin whether it would be a problem if the developer could also add information to the system,

> Martin answers: "We want that … it will actually implement an 'open book' policy whereby local people can actually see the way in which the development programme is stacked up financially over time, phase by phase".

In his view there should be freedom of access to all relevant information but also a commitment on behalf of the community to scrutinise this information over a long time period. His expectations present a strong challenge to existing norms of information disclosure relevant to planning applications and also to behavioural norms of residents. This exchange, as well as others recorded during both workshops put a strong emphasis on the issue of trust and the role of transparency in building and maintaining it. What Martin terms an 'open book' policy, is an important element in any public participation processes (Healey 1997; O'Neill 2002) and cannot be separated from the wider policy context of PPGIS.

Other local residents were also quick to realise the potential of visualisation opportunities as they related to the development control process. In the following exchange local residents in the second workshop compare their experiences of how the impact of proposed developments are currently assessed with what a GIS might offer.

> Tom: ‘‘I think it would be very nice if when the future planning applications came in they were obliged, or it could be arranged, that one could get a kind of pictorial view of the proposed building. We have access to elevations and plans and we can read all those and get an idea, but it is possible to make pictures as it were of buildings, like we’ve all seen on television. That would be most useful because we would then put that on the site as it were. So we were looking at our proposal and there’s the building, and we could then form an opinion on what we thought about it.
> Tessa: ‘I think that’s a brilliant point because what that would then bring up is the relationship of the size between what’s proposed and the surroundings’
> Alice: ‘I don’t think the Council would agree that though would they?
> Tessa: ‘But it also starts to relate to the ordinary, the everyday environment..
> Alice: ‘Well the advantage of photos and the GIS are that you could see how they are linked in. I think when you just go to the planning applications, you know in your mind where it is, or you know it’s next door to your house, but to be able to see it with everything around would make it much more realistic.’ (W2)

Being able to assess the impact of a development in a holistic way through the visualisation techniques offered by a GIS seemed to take account of the local context in ways that existing assessments provided by both developers and the Local Authority did not. Participants went on to discuss being able to simulate seasonal changes in views, leaf cover and the effect of sunlight and shade and while these ideas are clearly influenced by people’s experience of mass media, there was also a genuine sense that GIS could provide a more realistic portrayal of how development might ‘fit’ a place or not.

If there was strong agreement in both workshops that the planning process needed to take account of local information and local context more effectively than was current practice, of equal importance was having access to the same information that decision-makers used. For example, in the first workshop Anna and others discuss the merits of the GIS:

> Anna: “It does help meeting their arguments on the same ground. I’m profoundly a-spatial person. So that kind of thing of thing is great in making me think spatially. And if you have the same software as the highway engineers, the traffic people have. It’s not rocket science to use it. I mean, you can start having more informed debate rather than - well our prediction say X, and you say: ‘Hey! That’s what *he* said”.
> Rose: “You don’t have to actually look for the information. It’s there so you have a basis to already start thinking about it further. Because you can say: ‘What would happen if I do this?’ It takes you up a level”.(W1)

Being able to have ready access to the same facts that local planners used and having all relevant data in a single place would allow local people to better assess the implications of development and to prepare their case. Residents wanted to be in a better position to scrutinise decisions and to hold the local authority to account. In other words providing a 'level playing field' in terms of all relevant information seemed only fair if local people were to play an active role in both scrutinising and contributing to the decision-making process. The clear challenge for PPGIS is to develop more pluralistic technologies that offer data sets that are comprehensive in terms of the planning information they provide, and which can be supplemented by community-generated information (Ghose 2001). More critically however, participants acknowledged that the information provided in any public GIS would be determined by existing institutional norms and practices.

Institutional practices, norms and the role of trust.

The wider literature on Geography and Society has emphasised the epistemology and political economy of GIS and the power relations associated with its use (Sheppard 1995). In particular, critical theorists like Curry (1998) have pointed to the 'mystique' of GIS which disguises how these systems 'think', where users are 'located' in relation to GIS images, how holistic nature is re-presented as layers of information, and the power relations constituent of, and reproduced by these complex systems. While the several dimensions of these critiques are unlikely to find expression in the narratives generated during the two workshops, it is clear that participants in both workshops struggled with the social and political embeddedness of GIS and with the expectations they make of users. For example, participants struggled to understand the obligations and expectations of the institutional practices and norms of the development control process and with how GIS is enmeshed with these relationships. In the second workshop Valerie recounts her own experiences:

> 'a bit of my local park, which happens to be privately owned, and the person is quite willing to sell it I understand to the Council, but the valuation of the land is under dispute. And one of the things I wanted to know, was how much green space in my area did I have for the population? Was this higher than average in the country, lower than average?… If they built houses on the land, was there a recommended size that a house …. How many people lived in the area in comparison to the parking that was available? Which, if they put another ten houses in there, was there any space for these people to park? That kind of information - which is not the minutiae of local planning but just more general information about the environment. Because I felt that we would have made a better case for keeping the land than otherwise. …. Well this information is available at the Council I believe but it would be useful if it was on the Internet site so that we could look at it and say "Hey, there's a difference" or "they're right up to the margins or right up to the limits on a particular development ."' (W2)

Valerie's expectation of the development control system is one that suggests decisions are made against a set of explicit criteria that the local authority is expected to uphold. Without being able to identify what criteria apply to particular policies in the

local physical plan (the UDP), it was difficult for the public to object on grounds that would have a material bearing on to the case. Similar opinions and views were expressed by the participants of the first workshop. Of the 23 participants, only one was well versed in the UDP and knew where to find the information that he needed to participate in the planning process.

Positioning development control as a technical and rational process, these concerned residents expect the development control system to gain legitimacy by being explicit and transparent about the criteria and environmental standards on which decisions are being based. Such criteria-based policies are currently part of the proposed reforms of the planning system proposed by central government (DTLR 2001). But, underpinning these participants' concerns is a desire to behave as responsible citizens and only if a GIS were to be 'properly' compiled would it support this role. Local activists were less convinced of the integrity of the planning process and the role 'information' alone might play in democratising this process. As Martin puts it:

> 'It has potential, it's simply information, it gives a little bit about policy, the development and planning process is fantastically complicated. Information is just the beginning of each subject. There are frankly simpler ways of getting this information, such as the Unitary Development Plan. Now, information is power and all of that, but there are things like the political process, the property market, property development, traffic and all of that… Now it's all very interesting to know that it's a site of nature conservation, and this, that and the other. But in the real world, virtually every site in that situation, given the property market and the political process, nature conservation policy is going to be overridden by more important factors.' (W1)

Being able to trust information incorporated into GIS, is hence a critical issue raised in both workshops for without trust there is no basis for promoting responsible behaviour. For example, if the Local Authority expects its residents to be active and informed citizens by responding to consultation initiatives, there has to be a strong basis of trust on which to conduct this relationship. Providing early public access to the development process is seen as one critical procedural change that local residents in the second workshop believe to be important for promoting a more trusting relationship.

> Edna: 'One of the problems of planning applications – especially if you've got a fairly important site…is that the planning application is often the end of the process rather than the beginning of the process. And planning applications are often the outcome of negotiations and 'gives and takes' between the Planning Department and the would-be developer. …The decision-taking process has gone too far by the time the planning application is in the public domain. So what one needs is to have a better early warning system which really means highlighting sites which are under discussion, which are ripe for development, and really putting some information into the public domain before you actually have a planning application. And, there is the question of legalities. As far as I know a Council as a Planning Authority are not required to put anything in the public domain until there is actually a

planning application put in. But that is too far down the line for important sites.' (W2)

Requiring a change in institutional procedures and practices, this 'early-warning' system is born out of a sense that at the moment the development control process is neither transparent nor accountable and perhaps open to abuse by special interests – including developers. By excluding the public until the development application is submitted, local people feel their right to be involved in the planning process is not being addressed fairly. One means of better exercising this right appears to be offered by the ability of a GIS to provide information on all brownfield sites and the stage each site has reached throughout the development process. Were this 'early warning' facility to be provided in a GIS then residents groups would be better informed about all sites not just ones in their locality *and* sufficiently early on in the development process for them to have a material impact on the decision process. In practice therefore participants' concepts of active citizenship and their understanding of the political dimensions of local decision-making are reflected in their assessments of GIS as a planning tool. Likewise, conceptions of responsible local government are reflected in their appraisals of the usefulness and effectiveness of Internet sources – especially in terms of how these resources might assist users to hold the local authority and developers to account.

In both workshops the information sources available to participants were not restricted to those provided by the Local Authority and other sources of information were also explored. For example, web sites maintained by NGOs (like Battersea Power Station Action Group, Friends of the Earth) were visited and governmental web sites (such as the Environment Agency) and commercial web sites (UpMyStreet.com and Homecheck.co.uk both contain local information). During discussions, participants were asked how they would feel about connecting the local planning system with these other information sources. In both cases answers were very positive and in particular participants were interested in connections that could raise intelligence about environmental quality – including land contamination and pollution sources. However some experienced users of the Internet were less convinced than others.

James expresses his concerns: 'One of the problems with overload, is that information on the Internet, generally it's public information in the public domain and it's free information and it's not very valuable, because anybody who's got valuable information doesn't put it there. That's the fundamental difficulty or problem with the use of the Internet…. You go on the Internet and you look for 2-wheels small-wheels bicycles you get 10,000 references … none of them have got any information that I need - because it's all public information which is very uninteresting.'

Other participants did not share his scepticism. Instead, they welcomed the opportunity to utilise the enormous source of information these external web sources provide. For example in the second workshop Alice begins to speculate about how a 'profile' of developers and landowners could be explored.

"I've realised that many of the developers are from outside, the people are outside, they have no personal interest in this community what so ever, it's

> purely money, it's an investment. And I feel if we could somehow know, not just know what the interests of the person are, but where they live, or where they come from. Because they can affect so many other peoples lives and not be at all interested in the quality of life that they're maybe severely affecting.' (W2)

Her speculation demonstrates that local residents are prepared to use GIS as a means of actively monitoring and scrutinising a range of routine practices undertaken by the local authority but also as a means of naming and shaming 'undesirable developers'. Much as Sieber (2000b) suggests, effective use of interactive PPGIS involves groups in conforming to the requirements of the system but they also provide opportunities for moulding these systems to their own objectives.

The position of the local authority in this information network seems unproblematic for most local residents but was much more critical for community activists. During the first workshop, community activists pursued the idea of community-operated system but they are aware of the resource implications of needing to frequently up date this kind of locally owned GIS. They feel that ownership and being able to trust information are important aspects of such a system but the question of who should take responsibility for providing and maintaining the system was difficult to answer: 'It might be wiser to think of it as an independent locally-based facility rather than [the local authority] … an 'enlightened local authority' should carry out such a system. Other participants suggested that a third party (such as a university) should develop and maintain it. Uncertain about the resource implications and the integrity of most local authorities to act as 'honest' information brokers', means that activists are all too aware of how difficult it is to construct and maintain such systems. Participants in the second workshop did not share these concerns. Instead they were happy to see the system as part of the services provided by the local authority.

> Tessa: 'I think the Council should be the start, because as part of our democracy it is a focus and has credibility. I don't have a problem with the private sector being involved …we did have a very illuminating talk form one of the facilitators about some of the information that was there. And therefore I think that makes the Council doubly important because they should be some sort of filter, if they can be by not linking us to something that is substandard in terms of the information that's provided.' (W2)

In summary, all residents wanted to be able to monitor the local authority as an enforcer of environmental standards and to hold it to account. But, whereas many residents were prepared to trust the local authority to protect the public interest in matters of quality control of 'information', community activists found this position completely untenable. Such conflicting views about the role of the local authority raise issues of accountability and questions about how democracy in a market-based economy is to work. Being able to trust the local authority to protect the public interest both in terms of providing information and in making justifiable decisions is the basis on which representative forms of democracy function. If the local authority is not trusted then citizens feel disempowered and seek more participative forms of democracy. As is shown here, different publics hold different views about what democracy itself means.

Democratising PPGIS is hence a political as a well as a technical process and it is unclear to what extent PPGIS can challenge existing norms of governance.

Discussion

Several issues about the potential of GIS as a planning tool are raised by this study. First, members of the public who are already active in their local community believe that the main potential of GIS as a planning tool lies in its use in a range of public participation settings. Such settings would include arenas associated with more collaborative approaches to planning such as Planning for Real events, and community and area forums. Facilities offered by a GIS for examining the spatial outcomes of alternative policy scenarios for adjacent neighbourhoods and representing them in an accessible and cumulative ways are thought to be a highly innovative way of addressing some of the NIMBY responses provoked by conventional public consultation practice. Requiring new institutional practices of public consultation and involvement in the planning process, these more participative approaches are regarded as essential if GIS is to be more than an 'add on' service to the planning system. In other words, the communicative potential of PPGIS is context dependent and cannot be taken as given.

Second, there is a general acceptance that a GIS that incorporates information from the UDP and planning applications relevant to the development control functions of the local authority is useful if it provides the same information planners and local politicians base their decisions on. In other words, people believe they have a right to know what information is being used in the local decision process. This 'right to know' is based on residents' constructions of themselves as 'responsible citizens' who take an active part in civic affairs, but also on their constructions of their relationship with the local authority. For residents who take an active part in environmental planning, the local authority is construed as an enforcer of agreed and explicit environmental standards but also as an institution that needs to be responsive to local people's concerns. Being an active citizen in these terms requires not only that citizens feel able to act in this way but also that the local authority can be held accountable in both these roles – as enforcer and enabler. In this respect the role PPGIS can play as a decision-support tool is embedded in social practices that undercut its role as a source of information. On the basis of these workshops the public is sceptical about the extent to which PPGIS providers can, or will seek to challenge existing norms regarding available 'information' or the openness and transparency of the decision-making process.

Third, the monitoring role people envisage a GIS offering requires that the decision-making process is an open one, not only in terms of providing access to all information relevant to the decision-making process, but also in being explicit about the criteria used in decision making. Many local people who are prepared to take the time to monitor planning applications believe that the development control process should be a 'criterion-referenced' process. Unless the GIS is able to provide information about the criteria which apply to particular policy zones or areas in the borough, it is difficult for local people to play a 'proper' role in a scrutiny process. This is a question of fairness and

transparency. Community activists understand the development process to be a much more complex one than the technical and rational process of 'applying criteria'. Their experience reveals that the kind of information currently available in the public domain is only part of a highly political and flexible process of decision-making which access to a GIS does little to challenge. However, both perspectives require changes in rights of public access to information and in judicial procedures that would permit full and early public scrutiny of development applications.

Fourth, community activists understand development planning and the development-control process as a political process that serves some interests and not others. This understanding is not surprising given their motivational roots. However, whilst local residents criticism of these same concerns was more indirect, it was equally prescient. In both cases the planning system was not regarded as 'neutral' and working in the interests of a local public, but was widely believed to be open to abuse and insensitive to the concerns of local people. Local activists whilst prepared to accept that information is power, are adamant that the question of 'who' controls this information is critical to determining whether the GIS promotes the democratisation of the planning system or not. On the other hand, as their elected representative, local residents were more likely to trust the local authority to provide the kind of information to which they desired access. Underpinning these differing perspectives are questions of trust and questions of how democracy itself is to operate.

Conclusion

The study reported on here provides three important insights. The first relates to the changing political and social context of the UK within which the new technology of GIS is to operate. Other insights relate to the PPGIS research agenda.

Within the UK, central government is championing e-planning systems as a means of improving public access to the planning system and as a means of speeding up planning decisions (DTLR 2001). This study however suggests that pubic evaluation of GIS and ICT based planning service cannot be separated from wider questions about the legitimacy of the planning process and of local government. Based on the findings of these public workshops residents want to be able to act as responsible citizens and to play an active role in the planning process. To achieve this role they seek structural and judicial changes in how the development control process operates because current practices perpetuate secretive and 'closed' government and are regarded as unfair. Without these changes and a greater commitment to participatory forms of democracy, GIS linked to a computerised planning system will be just another source of contested information. As Michael Curry argues it is easy to be seduced by the 'mystique' of PPGIS (Curry 1998). This study reveals that active publics are equally sceptical about the putative benefits of PPGIS as a planning tool. Noteworthy is the separation that the recent Planning Green Paper (DTLR 2002) makes in putting the issues of community involvement within the context of local plans, and e-government services into the customer orientated approach, in which the speed of delivery is the most important factor. The study demonstrated that these are not two separate arenas of public concern. Instead the research suggests that the proposed community consultation strategies advocated by

the new planning reforms need to address these twin concerns together both at a strategic and local level.

A second insight from this study is relevant to the wider PPGIS agenda. While some reports of experimental settings exist in PPGIS literature (for example Jankowski & Nyerges 2002), there is a lack of research that combines technical developments in GIS with cultural and ethnographical studies of deliberative and participatory approaches to environmental decision-making. Our study demonstrates that this combination can provide insights about the role that situated knowledge plays in influencing public attitudes to PPGIS and about the arguments and discourses employed by differing publics to challenge or support the promise of 'increased participation' PPGIS seeks to offer. Through a focus on discourse, this approach serves to reveal the subtle but formative ways in which wider social relations are given voice. Such relationships are often poorly captured by conventional questionnaire surveys and in PPGIS research have tended to remain largely in the realm of theory.

Finally, we should emphasise that the experimental design and qualitative analysis of these public discourses is but a start. There is a need to continue to explore the interactions of different publics with PPGIS as a means of better understanding how those who are marginalized in planning discourse (by consent or by constraint) can benefit from the introduction of these new technologies. Furthermore, as Internet-based systems become more common place in a range of public settings, it will be possible to combine statistical information on their use with studies that are contextualized and informed by social and cultural theory. Current interest in participatory GIS, such as the recent American–European research meeting on access to GIS and participation, and the expected adoption of the Aarhus convention on "Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters" (see Haklay, in press) should provide the motivators and framings for further research.

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M/F	M	M	M	M	F	M	M	F	F	M	F	M	F	F
AGE	51-64	35-40	41-50	51-64	41-50	41-50	41-50	41-50	41-50	51-64	51-64	41-50	25-34	24-34
Computer Literacy	B	E	N	N	B	E	E	E	E	N	N	N	E	E

Table 1: Participants in Workshop 1

M/F	F	F	F	F	F	M	M	F	F
AGE	60	60	40-50	50-60	18-30	60	75	30-39	40-50
Computer Literacy	B	B	E	B	B	B	N	B	E

Table 2: Participants in Workshop 2

Key: Computer Literacy – E = Experienced; B = Basic or average experience; N = Novice or little experience