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ONLINE PARTICIPATION: THE WOODBERRY DOWN EXPERIMENT

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by

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Abstract

The internet and world wide web are generating radical changes in the way we are able to communicate. Our ability to engage communities and individuals in designing their environment is also beginning to change as new digital media provide ways in which individuals and groups can interact with planners and politicians in exploring their future. This paper tells the story of how the residents of one of the most disadvantaged communities in Britain – the Woodberry Down Estate in the London borough of Hackney – have begun to use an online system which delivers everything from routine services about their housing to ideas about options for their future. Woodberry Down is one of the biggest regeneration projects in Western Europe. It will take at least 10 years, probably much longer, to complete, at a cost of over £150 million. Online participation is one of the many ways in which this community is being engaged but as we will show, it is beginning to act as a catalyst. The kinds of networks which are evolving around systems like these will change the nature of participation itself, the ways we need to think about it, and the ways we need to respond. Before the experiment is described, we set the context by describing the wide range of digital media for communicating plans and planning which suggests a new typology for web participation consistent with this fast emerging network culture.

Acknowledgements

1 Introduction: Computers and Communications in Planning

A generation ago, planners thought of computers as tools for developing a better understanding of their cities and for resolving multiple conflicts between design objectives through the automatic generation of plans (Batty, 1971, 1980). Of course, there were substantial reservations concerning the extent to which such tools could reflect the qualitative dimensions of any particular problem but the notion that such tools would eventually be used for communicating qualitative ideas would have seemed farfetched had it ever been mooted. The seeds of this convergence between computers and communications however had been laid at the very beginning of digital computing itself but it took 50 years before the representation of information in digital terms began to merge with its communication (Batty, 1991). This in turn required communications hardware to become digital. This only began to happen as computing became more ubiquitous and as miniaturisation of hardware reached the point where it was essential for computer users to communicate with other computers and with each other, remotely.

In the last decade, these changes in the way we are able to represent information digitally and disseminate it over the net using the simplest and cheapest of devices has revolutionised the economy, and many other social pursuits. The internet, in turn, is simply a synonym for multiple, interacting, local area networks on a global scale, and its graphical interface in the form of the world wide web provides the current media through which most of us engage in its use. The web, however, is but one feature of ubiquitous digital communications. Computing is now being likened to a power grid in which wherever you might be, it will be possible to draw down raw computational power with an immediate ability to communicate interactively. Computing will increasingly be supported by wireless devices which will spread information processing to every place, at every scale. Voice may well become the dominant way we engage with computers. There is little doubt that the revolution has only just begun and the implications for participation in planning are truly momentous. We need to take stock for these new technologies are about to radically alter our understanding, not only of participation but even of planning itself.

Much has been written about planning and design as collaborative, communicative processes (Healey, 1997) and it would now be strange if these new modes of digital communication were not having an impact on every area of its activity. Formal participation, too, is deeply embedded in institutionalised planning, in the west at least, and has been mandated in one form or another for over half a century (Rydin, 1999). Looser strategies based on involving various groups and individuals as much for their expertise as for the impact on their quality of life are increasingly common, and any discussion of how new IT is affecting participation must be cognisant of domains much wider and different from the traditions of statutory planning. Moreover, online participation can be examined from many different perspectives: from the technological which makes it possible; using particular kinds of software such as GIS (geographic information systems) which lend themselves to communicating visually through maps; in terms of community design; through group problem-solving in which professionals of various kinds are brought together; and from the perspective of democratic representation and the way network culture can support, extend, and even distort traditional collaboration.

In this paper, we do not intend to present a theoretical rationale for the kind of participation that we are involved with. Our project is part of a much wider statutory process of urban development and design which involves the entire gamut of professional and political representation at the neighbourhood level. A strong, distinguishing feature of our project is its longevity. Most public participation schemes, whether based on traditional or new media, have been relatively short lived affairs, often designed to engage the wider community in responding to some particular plan or scheme which must be implemented rather quickly. In contrast, participation which emerges spontaneously, can be much longer lived as in the activities of action groups who have successfully resisted, for example, major road proposals in London. In the Woodberry Down experiment, participation is regarded as a permanent part of the process of development, not only through the 10 year regeneration scheme from which our own involvement arises, but through the local resident and tenant committees which already exist and which are continually being reconstituted.

We will begin with a brief review of new digital media and the way this is influencing different forms of communication. This sets the context for the development of a new typology of participation which we call 'net participation'. We then show how different kinds of participation which use the new media to greater or lesser degrees can be represented as different paths through this net. The Woodberry Down project represents one such path and we first sketch the background to the area, illustrating the critical problems of deprivation which dominate the regeneration that is taking place. We then provide a blow by blow account of how the online system we have built, emerged. We detail the stop-go nature of the funding, the problems of ensuring that the residents and their representatives engage in its use, the way the community has been wired to ensure this, and the kinds of technical detail that are central to making sure the system delivers information in a robust and timely manner. One of the central issues that we bring out is how such a system requires a 'champion', how the system needs to be supported by a wide range of interested agencies, and how the deeper the problems of deprivation, the more those affected appear willing to try anything new. Our conclusions are not entirely sanguine. Such efforts help in pushing the frontier of what we are able to do technically as well as identifying the problems of learning how best to exploit new technologies which are sustainable (Bullard, 2000).

2 The New Media for Participation

Participation in planning requires information that is strongly dominated by visual media in the form of maps and pictures with text an important subset of such data. Numerical information is less digestible to all but an expert audience. The way digital forms of information have developed is however in reverse order with computing being dominated for many years by numerical data, text only coming within the last 20 years due to word processing, and graphic data only becoming dominant in the last decade. Voice still remains a problem, both of encoding and transmission, but as computer memories continue to increase and as bandwidth becomes ever greater, then it is expected that much information in the future will be delivered by audio. This progression from numbers to words to pictures reflects declining costs of computer

memory and increasing bandwidth but these still limit what can be transmitted. Although networked computing existed for many years prior to the development of the world wide web, it was the development of graphical user interfaces in the form of browsers that enabled mass populations to go online. Without such graphic interfaces, the idea of online participation would be impossible.

Hardware is critical in such communication. Computers need to be powerful enough to process pictorial information while networks need to have enough capacity to enable users to communicate quickly. This is the real bottleneck in using current systems. Most of those to whom online participation is geared do not have network access other than through traditional phone lines and this limits the speed at which they can receive visual information. This is absolutely critical in developing systems with media that can be delivered quickly and successfully and much of our own work in Woodberry Down has been focused on developing systems that are workable and robust in these terms. These issues may seem a far cry from the real issues of public participation but they are crucial to the systems that can be developed. Most systems are essentially passive in that information is delivered in one direction only – from the server to the client – with any interactivity on the client's part – the user – being simply geared to choosing what information it is that needs to be delivered. Acting on such information and feeding this back to the server or provider is still quite rare but as we shall see essential, if online participation is to move beyond a digital version of simply telling those affected what is planned (Laurini, 2001).

Software of course is the key to developing successful systems for software unlocks data and turns it into information. Good software developed by those who serve information can turn that information into a form that is intuitively digestible by the user, the best examples being good pictures and words that communicate the essence of any issue in the most effective way. Anything more than this depends on setting up the communication so that users can act on the information. Perhaps the most low key way is to provides users with data that they might manipulate themselves. For example, there are now many web sites which deliver numerical data on planning issues which users can store locally, examine and manipulate offline, at their leisure. The London borough of Wandsworth's planning applications site where readers can examine recent applications and decisions and map the data is a relatively passive

form of information delivery (http://www.wandsworth.gov.uk/gis/map/mapstart.aspx) although users need to be able to interpret the meaning of such data (Haklay and Tobon, 2002). Sites which deliver raw or processed data such as neighbourhood statistics enable users to download the data into packages such as *Office*, and then engage in further processing (http://www.neighbourhood.statistics.gov.uk/home.asp). At the high end, sites such as *CASWEB* that deliver data in a format that can be read by GIS or CAD packages (http://census.ac.uk/casweb/) assume an expertise which is highly specialist.

The biggest problems occur when good participation requires animated graphics, often more than maps, representing built environments through which users can move and fly. These kinds of virtual reality often require the user to decide what and where to navigate and in this sense are truly interactive. Web browsers have long been configured for such navigation but there are still severe problems in delivering such information over standard phone lines. The dilemma of course is that the best information about a planning scheme usually requires such representations. Much of our technical work with Woodberry Down involves using and adapting such software so that rapid fly-throughs and related manipulation of visual data is possible over the slowest and least capacity networks. An example of this kind of media is on CASA's online planning site at http://www.casa.ucl.ac.uk/online.htm. Recently there has been considerable interest in the use of GIS software to enable participation and in particular desktop GIS has been adapted to web-based processing. Internet map servers deliver information which is processed on a central server to a client who issues commands and who activates the kinds of functions that require some knowledge of the problem. A good example is our 'Sustainable Town Centres' site. This allows users to take layers of data which indicate various indicators of sustainability and to weight and combine these to produce an overall index which can then be used to rank order different centres by the degree to which they are sustainable. This online tool really moves beyond the realm of participation for it is useful only to those who have an expert interest in town centres that requires, in turn, some expertise about the socio-economic functioning of land use and transport in cities (see http://www.casa.ucl.ac.uk/newtowns/index.html). Users query the data set and decide the various weighting and ranking using a tool which is built around an

internet map server where all data and processing takes place on the server-side but under the control of the client.

Truly interactive participation usually requires users at each end of the process acting in concert. Bulletin boards and their graphical equivalent in terms of white boards, act in this way but require active responses and some identity of interest to make the system function. As we will see in Woodberry Down, the bulletin board capability can be severely compromised if those who set it up are limited from responding to users due to legal and other restrictions. Slightly shorter and sharper interactive responses between users at the server and client ends are contained in group decision making, in networked design studios, and in internet systems that actively involve users in community design. For example, the Architecture Foundation have developed a toolkit for engaging the community in urban design which they have developed as a passive web resource in which users can follow the design process (see http://www.creativespaces.org.uk). This has been developed into a much more interactive resource – The Glass House (see http://www.theglasshouse.org.uk) – which enables users to interact with the various design options. The Glass House uses state-of-the-art visualisation technologies which can be delivered quickly and at very low cost across the web and which have been developed in parallel with our Woodberry Down project.

There are many decision-making procedures usually fashioned for experts which involve internet-based communications. These have been developed on local area networks and are gradually being ported to the internet. Invariably these involve some form of structured problem-solving supported by various models and databases (Jankowski and Nyerges, 2001) but in general, such decision support systems are not suitable for the kinds of participation that we are involved in here. Of much more relevance are totally interactive systems in which there is no assumed hierarchy of users. Chat rooms and related forums are primitive examples of such communications but where such interactive modes come into their own is through the idea of virtual worlds. Examples of these for design are rare as the very notion of developing such visual representations in which users can appear as avatars is highly exploratory, notwithstanding some notable examples which show considerable promise for enhanced methods of participation (Schroeder, Huxor, and Smith, 2001; Smith, 2001).

The Leeds group (Carver, 2001; Kingston, 2002a) suggest that these different ways of online participation can be arranged in analogy to Arnstein's (1969) well known ladder of citizen participation. At the bottom rung of the ladder, participation exists in an entirely passive mode as 'the public right to know' while full interactivity exists at the top as 'participation in the final decision'. The Leeds ladder begins with passive online service delivery and ends with online decision support system of the kind developed by Jankowski and Nyerges (2001). In fact, we must add to the Leeds ladder for our own examples extend to community design and virtual worlds where, at least in principle, many more actors or users can be involved than in decision support systems. The ladder can be elaborated as follows through its different stages and in Figure 1, we show an augmented ladder of e-participation following the Leeds group which reflects these ideas.

Figure 1: An Augmented Ladder of e-Participation
(after Carver, 2001 and Kingston, 2002a)

Any classification of diverse activities such as participation represents an oversimplification. Figure 1 implies that as we move up the hierarchy, each successive step embraces lower steps on the ladder whereas no such strict embedding actually exists. Moreover at the top of the hierarchy, decision support, design systems and virtual worlds can collapse into one another and these stages are defined with examples of current practice in mind rather than based on any fundamental differences in the process of participation. However to show how the classification

helps in thinking about online participation, we need to widen our discussion to embrace different types of user and to define different types of problem.

3 Net Participation

It is therefore necessary to ground our argument in different types of online participation so that we are clear about the limits and scope of our experiment in Woodberry Down. There are different types of user and provider who determine the type of participation that takes place. In terms of technologies, different kinds of software and data determine what is possible. In this paper, we assume that we are talking about systems which are available, at least in principle if not in practice, in the public domain and this means that we are dealing with systems that operate on the internet through web browsers. Much of what we have to say about the ladder of e-participation and the net of participation that we sketch below, might equally apply to participation using desktops shared amongst people interacting in a physical setting, or even people interacting with no computer media at all. Nevertheless the classification that we will propose is structured around the idea that networked computer media represent the *modus operandi* of such participation.

The two ends of the participation spectrum are defined by providers – those who produce the information that is to be used in the participation process, and the users – those who consume and react to this information. Potentially these are the same groups. Providers might be users in one context and users providers in another and it is entirely possible to see effective participation as a dialogue between providers and users. Providers first communicate information to users who respond by becoming providers in their own right – of the responses, that is. These are then consumed by providers acting as users, and so on around the loop. Technically in terms of the hardware, providers serve the information from sources that are different to those where users consume it. In truly networked situations where the media allows many users to communicate with each other, providers remain in the background, often having their own networks which support the communication where providers communicate with other providers. We will not explore this ramified networking any

further here but there is much that might be researched about different forms of network that are implied in various kinds of online participation.

As with the ladder of e-participation, we will define just seven types of provider and user who we will treat interchangeably. The magical number seven does not imply a definitive list of types but it is manageable. The list ranges from those with high expertise to individuals who have no expertise other than the most basic of IT skills. The categories are: IT experts (those who design the system), professional experts (those who decide what information about planning is to be communicated), professional groups (those who have an interest in planning and who influence the experts), interest groups (those who have a general but informed interest), politicians (those who have a specific mandate for action), community groups (those who come together to mobilise local interest and concern), and individuals (those who are directly affected by any scheme or issue). To give a sense of the way these actors can act as both providers and users, consider a simple web site in which professional experts in a local authority decide the information which is to be communicated in the simplest of forms as text and pictures. These providers are then influenced by who uses that information which we assume are individuals acting singly. Through monitoring such use, they then use this information to reconfigure the site, and so on. This is perhaps the lowest level of participation which presumably occurs on local authority web sites which communicate planning information to a general public yet it does illustrate how providers become users as they respond to the use of the site.

The third element in the net of participation involves the kinds of software and media that are used to deliver information within different forums identified in the ladder of e-participation. Again we define seven types from the most sophisticated ways of producing graphics and visualising built environments to basic text and data. These are: full motion/rendering (in which designs for built environments can be manipulated on the web through reconstruction and query), 3d *VRML* (which represents a simple form of fly-through and user manipulation of the built environment but without any ability to generate one's own design), internet GIS (which enables users to query maps and to generate their own analysis of the map data at different levels), fast animations and maps (enabling users to query and manipulate 2d and 3d maps and buildings but not change their form), bulletin and white boards

(enabling users to respond to information using text and pictures), downloadable data (enabling users to take data from remote sites usually as tables of numbers), and finally web text and pictures (which are the most usual form where web pages have no two-way interactive content at all). A good example of many of these media are contained on our own web site under the various sections such as online planning and sustainable town centres, although to look at high end software such as *VRML* and beyond, then it is necessary to look at the sorts of web sites associated with virtual cities as reported in Batty et al. (2001).

We put this typology of providers and user together through the 'means of delivery' and 'what is delivered' as we show below in Figure 2. We can then use this graph to classify different online participation projects by tracing the various links between

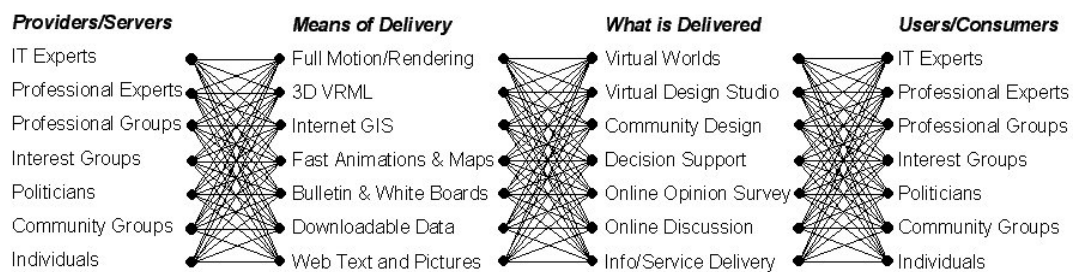| Providers/Servers	Means of Delivery	What is Delivered	Users/Consumers
IT Experts	Full Motion/Rendering	Virtual Worlds	IT Experts
Professional Experts	3D VRML	Virtual Design Studio	Professional Experts
Professional Groups	Internet GIS	Community Design	Professional Groups
Interest Groups	Fast Animations & Maps	Decision Support	Interest Groups
Politicians	Bulletin & White Boards	Online Opinion Survey	Politicians
Community Groups	Downloadable Data	Online Discussion	Community Groups
Individuals	Web Text and Pictures	Info/Service Delivery	Individuals

Figure 2: Net Participation
Participation which utilises online computing can be represented as a set of lines through this graph.

producers, means of delivery, what is delivered, and users. Such a graph helps us to visualise different types of online participation but it also pushes us to consider how we might augment different schemes by changing any of the elements that define a scheme, extending the providers and users and upgrading the software and media through which participation is delivered. To show how this net can be used, we will examine six different schemes very briefly. These schemes illustrate the variety that already exists but it also reflects projects that we consider good examples as well as those that are current.

Our first example is a typical local authority web site, the London borough of Hackney within which our case study falls. This site which is titled "*Hackney Live*" (http://www.hackney.gov.uk/) is as good an example of a local authority site as one might find at the present time. It enables text and maps to be displayed in

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conventional ways, data to be downloaded and users to provide feedback indirectly through email or directly through modified bulletin boards. It does little more than this however. Yet there is a link to the "*Map.Hackney*" site at http://www.map.hackney.gov.uk which has considerably more interactivity then the main Hackney site. *Map.Hackney* provides links to pages from which data can be downloaded. Various maps can be displayed of quite advanced and abstracted topics, while the site also provides some basic manipulable capabilities for panning and zooming on various maps, based on a primitive form of internet map server. The focus of *Map.Hackney* is hardly the casual user as there are extensive explanations of how GIS works. One of our ex-students is the author of this site and we can guess the origins of many of the ideas although as a site for planning students and practitioners, it is rather good. Whether or not this constitutes public participation is another matter.

We show the structure of these two sites in Figures 3(a) and (b) which immediately shows differences in their form. We would expect the typical structure of a web site associated with online participation to be dominated by providers who are experts and users who are individuals or communities of non experts. Currently, most technologies in terms of the means of delivery and what is delivered are rather passive and thus the structure of network links in Figure 2 would flow from top left to bottom right. This is the case in *Hackney Live* although *Map.Hackney* covers a wider range of links. As is clear from Figure 3, the set of links is never simple and although our classification is a little fuzzy with respect to what kind of provider and user actually develops and uses the system, this net does give some idea of how each site is structured .

Our third site is part of a wider project based on an explicit process of public participation called "Planning for Real" (PfR) involving the village of Slaithewaite in West Yorkshire. *Virtual Slaithewaite* is a simple but very effective web-based mapping tool which mirrors PfR, enabling users to post comments about different areas of the village characterized by different land uses with respect to different development possibilities. Users can zoom and pan a map of the village and identify any location for which they can then post comments. All the comments made so far can then be displayed by the user, and in this way, the user can form some idea of what others think of the development or conservation possibilities for the village. The

web site is not designed with any particular set of users in mind although it is likely that users would have to be fairly informed to generate useful debate. The tools are best used in association with some specific and direct participation process which during the life of the project, was quite well defined (Kingston, 2002b). The site is located in the University of Leeds at http://www.ccg.leeds.ac.uk/slaithwaite/start.html. The map tools are Java based, specifically designed by the Macgill as part of the *GeoTools* package (http://geotools.sourceforge.net/) which exists in the public domain. We have graphed its structure in Figure 3(c).

Our fourth example takes participation into the realms of fully-fledged visualizations of the built environment linked to map data bases. The Sheffield Urban Contextual Databank (SUCoD: http://sucod.shef.ac.uk/) is a resource developed at the University of Sheffield which enables users, presumably with a fair degree of expertise and interest in the history of the development of built form in cities, to explore urban form at different historical periods, to access map data and to visualize this in 3D. The resources enables users to extract 3D visualization from location and routes and to fly around such data bases using *VRML* (Virtual Reality MarkUp/Modeling Language) variants. In fact the level of interactivity in this resource is quite modest in that such visualizations and fly-throughs do not involve users in any more than 3D zooming and panning. However in principle, this resource enables users to query and to extract data which can then be used for professional analysis (Peng et al., 2001). The structure is shown in Figure 3(d).

The fifth project is rather different being based on the delivery of statistical data to the community. The Bradford Community Statistics Project at http://www.bcsp-web.org/ is designed to "…open up statistical information to community, voluntary and campaigning groups". This is essentially based on delivering area data about the Bradford region using *Map Guide* which is an internet map server from Autodesk. The interface as it stands is very smooth and fast compared to many but the problems lie in the expertise of the groups that will access this. These groups are something more than individuals with the most basic IT skills although training is available in the use of the web site (Meszaros, 2001). In fact as with many such projects, it is not possible to see this in isolation from other initiatives such as Bradford Resources Centre (http://www.brc-net.org.uk/index.htm/), the Bradford city council local

government web resource (http://www.bradford.gov.uk/), the Bradford District Community Website (http://www.bradford-net.com/), and the Bradford Community Research and Information Exchange (BCRIE) (http://www.bcrie.legend.org.uk/). Figure 3(e) illustrates the structure of the site.

Our last project has the same general focus but utilizes state-of-the-art software tailored to rather general users. This represents perhaps the longest standing project of any in this area of participation. The Glasgow model began in the mid-1980s as a research project to explore the development of computer-aided architectural design at ABACUS in the University of Strathclyde. The first model was fashioned as a fly-through using early Silicon graphics workstations where the 3D rendering was accomplished using the geometry chip that SG originally developed. The data was manually collected directly from street maps and heights estimated using simple surveying equipment with student labour. The model has been through many versions since then but in its current form it has been adapted to the web and it is essentially sponsored as a way of engaging tourists in learning about the history and location of important buildings in Glasgow (http://iris.abacus.strath.ac.uk/glasgow/). There is a particularly good link between the location map and the *VRML* browser. The fly-throughs that can be generated, are state-of-the-art. The building detail is rather coarse but the interface is visually attractive and efficient. The user base for this model is quite general and this is one of the few models available which enables individuals with a minimal skill base to experience the city. We show the implied participatory structure in Figure 3(f).

All these examples are not strictly participation exercises in the same way as our Woodberry Down project in that the focus is mainly on rather general, indeed generic forms of participation with a general public or unspecified group of users in mind. In fact, many of the examples of online participation based on CAD and GIS software systems are heavily driven by planning and/or IT experts and thus the focus is on simply demonstrating what is possible rather than any ongoing process which is rooted in the 'real' local community or indeed in 'live' problems. A recent review for the Housing Association illustrates this perfectly in that most of the examples are demonstrations of how CAD might be used to visualize new schemes rather than building up a process whereby the community can be continually involved in the

design of these schemes (HACAS Chapman Hendry, 2002). Woodberry Down is somewhat different as we will see. To set this context, we must now sketch the origins of the regeneration process from which our work has emerged.
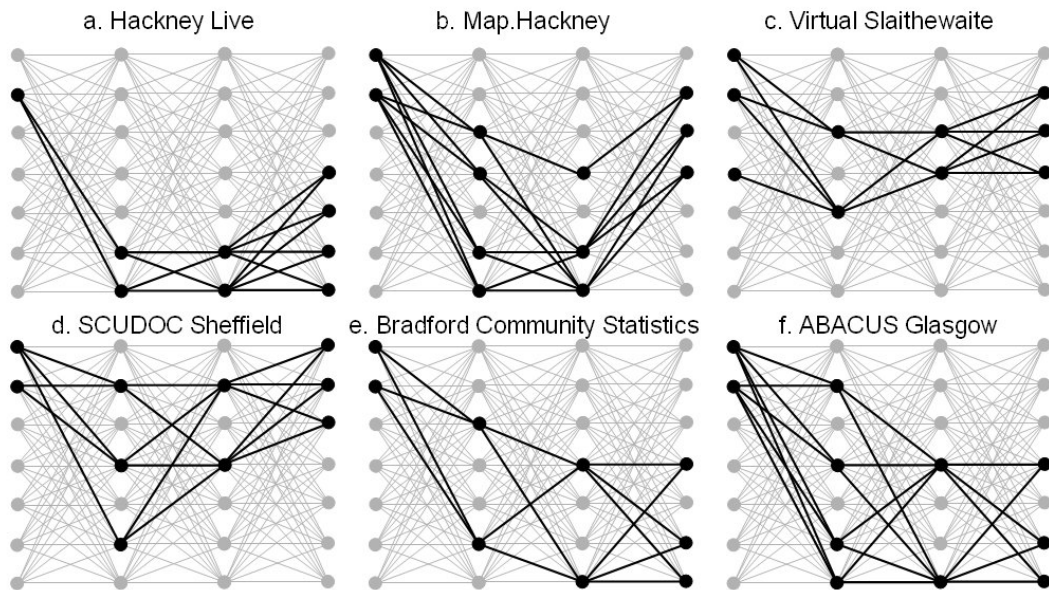
Figure 3: Nets of Participation:
Selected UK Web Sites Communicating Information and Enabling Participation

4 Hackney and Woodberry Down: Deprivation and Regeneration

During the last decade, British local government has been dominated by problems of grappling with the problem of public housing which was by and large created by those same governments two or more generations ago. The slum clearance programme and the re-housing of a very large proportion of the British population began in earnest in the 1950s and many inner cities came to be dominated by high rise dwellings under municipal control, built to relative poor standards and housing an increasingly deprived population. The run down in this housing stock due to poor maintenance, has been exacerbated by the migration of the most active and able into owner occupation, either privately or through the massive sell-off of public housing that has accompanied the demolition of the welfare state over the last 20 year. These inner areas are now dominated by a series of initiatives associated with regeneration, all of which involve frighteningly complicated sets of policies and instruments (Power,

1998). Many of these involve the financial underpinning of such actions using variants of the Private Finance Initiative in which the private sector is encouraged to provide the funds in turn for long term ownership of what is essentially public property.
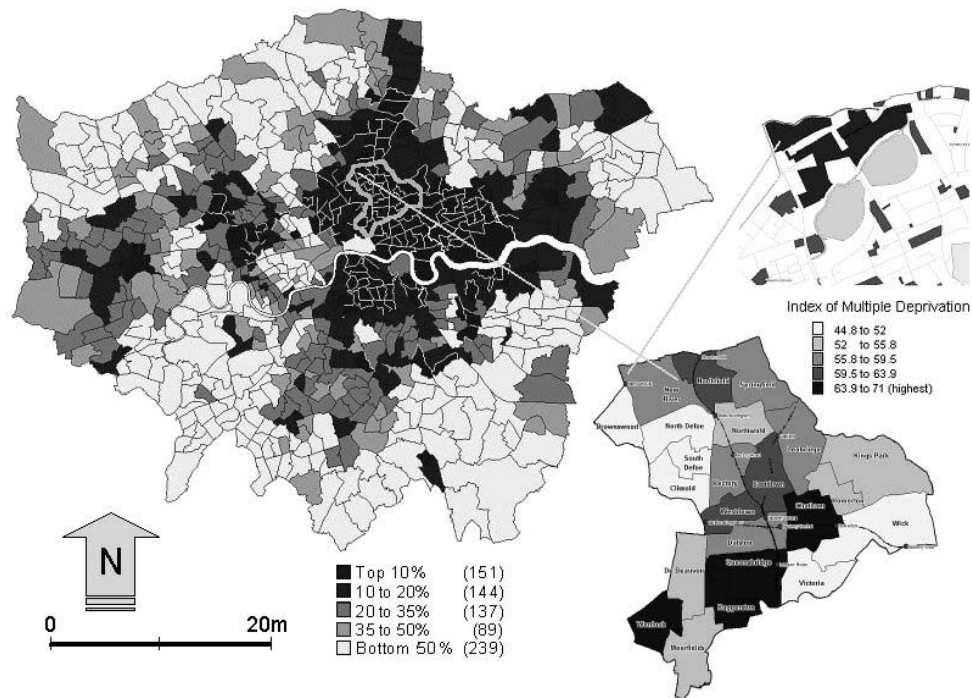

Figure 4: Deprivation in London, Hackney and the Woodberry Down Estates
The ward in which Woodberry Down is located is the top 3 percent of the most deprived area in England and Wales as measured by the 2000 Index of Multiple Deprivation

There are 1370 housing estates in England which have been defined as 'deprived' and 112 of these – 8 percent – are located in Hackney which is one of the poorest London boroughs. The best way of illustrating the context is through the index of multiple deprivation (IMD) which is composed of 6 indicators – based on income, employment health, education, housing, and access, with child poverty identified as a critical subset of the income indicator. These 6 indicators are weighted as 25-25-15-15-10-10 and then aggregated to form the overall IMD. When mapped, they provide a picture of the relative geographical concentration of key problems and problem estates in the country. Hackney is one of 33 boroughs in London with a population of around 207, 000 in 2001. 40 percent of its population are ethic minorities and 60 percent of its housing is in the public or ex-public sector. As a municipality, Hackney is the second most deprived borough in England but it has the largest concentrations of deprived estates in the land. All 23 of its wards are in the most deprived 10% of all wards in

England (where there are 8414 in total). 9 of these are in the top 3 percent and the ward in which the Woodberry Down estates are located is one of these. The pattern of deprivation is shown for Greater London, for Hackney and then for the estates in question in Figure 4. In fact the various housing blocks that make up Woodberry Down do not contain the most deprived households in the borough but in terms of the housing indicator within the IMD, this is in the top half of 1 percent of the worst housing conditions in England.
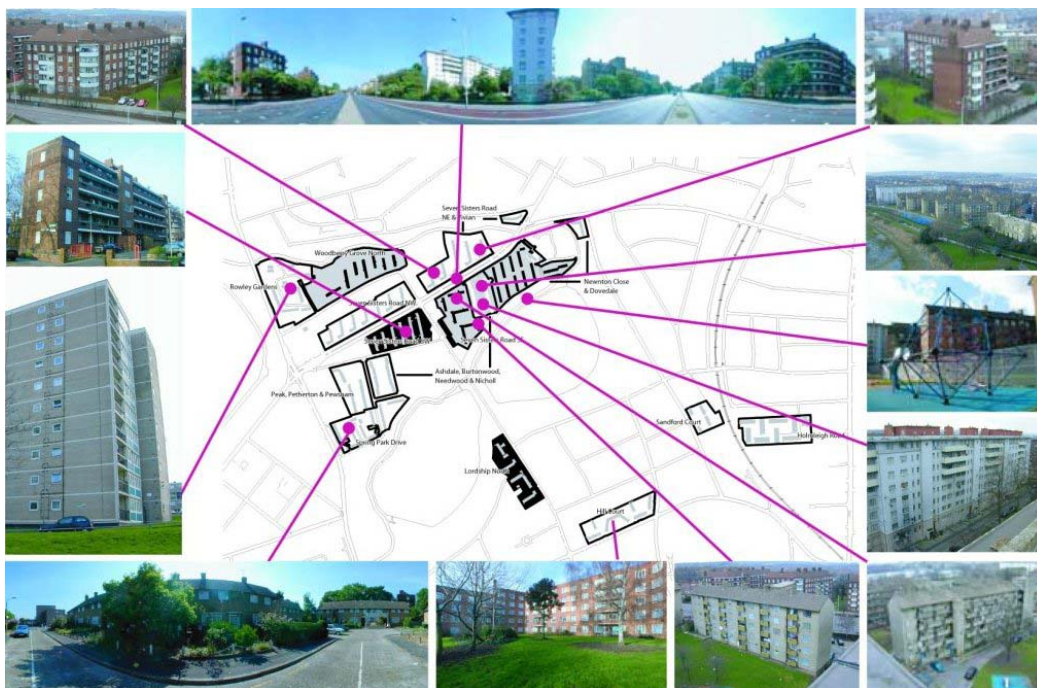

Figure 5: The Estates that Make up Woodberry Down

The Woodberry Down estates are in the Woodberry Down and Stamford Hill Single Regeneration Budget (SRB) area, the renewal projects being financed from this source of funds which is bid for competitively each year. In the wards that cover this area, more than 50 percent of all households reside in public housing and if the stock that has been sold off is added to this, then it becomes clear that the area is dominated by estates that are likely to require some substantial regeneration. We do not intend to develop an exhaustive analysis of the demographic profiles of the population for it is clear enough that the populations housed in these areas lack basic amenities. The estates in fact tend to be residual sinks for the worst-off and for immigrants in the area rather than being dominated by long-standing, aging residents. There are problems of

aging of course but the key issue is one of poor housing conditions in the first instance. To provide a quick visual impression of the kind of housing that we are dealing with, we show a collage of views around the 25 blocks that make up the estate in Figure 5. Like so many illustrations, the real sense of how run down the area has become is hard to imagine from these photographs although there is a degree of desolation to the environment which is captured by these pictures.

The area which is to be regenerated is comprised of the estates shown in Figure 5 which physically cross various administrative and historically integrated, ethnic neighbourhoods. The estates were originally designed as part Herbert Morrison's vision for better housing in London and the first housing blocks were developed in the late 1940s by Forshaw as part of his and Abercrombie's vision for London. The form drew their inspiration from the Bauhaus, even appearing a couple of years ago in the film *Schindler's List*. The oldest blocks are listed. There are around 6000 residents in 2500 housing units of which some 29% are owner-occupied. The Woodberry Down Regeneration Team (hereafter called WDRT) have divided the area into 18 distinct geographical areas although for purposes of resident consultation, these are currently aggregated into 14. There is considerable confusion with respect to tying the official statistics, noted above, to what actually happens on the ground and local surveys reveal that in these estates, the white population is in the minority at less than 40 percent with a strong dominance of Black and Turkish populations. These estates permeate the area of Stamford Hill which is the largest concentration of orthodox Jewish population in the UK.

The Woodberry Down project began in 2000 with the establishment of the on-site team and the beginning of negotiations for a Single Regeneration Budget proposal for some £25m which has been successful. Currently much of the project is dominated by the negotiation of a Private Finance Initiative to find the lion's share of the cost which is estimated at some £160m over 10 years. However, the project did not get off to a good start. The WDRT were located on site in public offices that were then a local library and the conversion to the team's HQ/centre led top substantial hostility amongst the local population. The team (WDRT, 2001a) report: "Local residents are still angry that not only was their library taken away but also that the centre is, to many of them, not providing any tangible benefit or service to the estate. The WDRT

believes that this is not because of the fault of the resident managers but due to the conception and delivery of this project" (page 11). In fact what this issue reveals is that there is substantial community participation and representation in the area already and the entire project is attempting to manage the regeneration through utilising this.

In the area, there are nine Tenants' and Residents' Associations with another two in the process of registering. There are six estates Committees serviced by Hackney Council and these meet quarterly. The Stamford Hill Neighbourhood Committee meets nine times a year and is attended by Council officers and local Councillors. The Council's Housing stock in Stamford Hill is managed by the Paddington Churches Housing Association and there is a monthly tenants' panel who discuss management. The Estates Development Committee (EDC) which has been set up to represent the regeneration of the estate cuts across these. It currently has 27 members whose role is to liaise with the WDRT and to represent the views of those affected by the considerable disruption that is about to occur as the regeneration gets under way. The process of online participation has been both motivated and endorsed by the EDC and the WDRT, and the web site reflects the close involvement of this Committee.

The WDRT have spelt out on behalf of the Council and the community very laudable and ambitious aims for the project (WDRT, 2001b). These involve conscious bottom-up consultation and involvement at all levels. In the first year, 12 community meetings were held, while all households had been contacted and the various meetings had formally involved over 20 percent of all residents in the area. In terms of the vision, there is strong wish to generate a sustainable estate development in which social and ecological threats are minimised and there is the explicit goal of taking account of new technologies in delivering services and involving the population. All these are consistent with the national government's 'modernising Britain' campaign. The worrisome aspect of the project, like most such initiatives in Britain at present, is that it is beset by different kinds of financial bargaining. These continually threaten the scheme by throwing it off course in terms of timing and diverting valuable resources to open-ended and inconclusive debates about showing 'best value for money'. We are currently three years in, £25m has been committed, £135m still has to be negotiated and signed off, designs have still to be prepared, and there is nothing to show for any of this, on the ground where it counts. Little wonder the resident

community are frustrated. We believe that the web resources we have developed at least go a little way to pushing what is clearly a tortuous process forward, and to these we now turn.

5 Development of the Web Resources

The decision to develop an online method for participation emerged in early 2000 from a series of related projects that involved projects in Hackney. The catalyst in many ways was the Hackney Building Exploratory, a community-based initiative which enables local communities to learn about their local environment and to participate in ideas about making it more liveable. The Exploratory is located in an old school within the borough and is full of fascinating models and maps of the community, built professionally from standard materials as well as informally by children and adults as part of their educational visits. In 1999, we began to develop a series of digital exhibits which complemented the material exhibits. This has enabled local residents to examine planning information using the latest ways of visualising development by gaining access to this media across the internet. It led to the direct development of educational software which let visitors to the Exploratory explore the local community using GIS, digital panoramas of street scenes within Hackney, different types of housing within the borough, and patterns of deprivation and disadvantage within the East End of London (Batty and Smith, 2001). Computers were located in the Exploratory and were an instant hit with children who form a very large proportion of visitors. A web-based version is available at http://www.casa.ucl.ac.uk/hackney/.

The Exploratory were also involved with the Architecture Foundation, a charitable trust devoted to promulgating good architectural design which has a strong community influence supported by the leading architects and planners in the UK (http://www.architecturefoundation.org.uk/). It also had good contacts with Hackney borough whose GIS team were actively seeking ways of extending the relevance of their work through other digital media such as 3D visualisations. Moreover the Architecture Foundation were organizing the British entries to *Europan 6*, a

competition for young architects of which an entry based on one of the sites in Woodberry Down was chosen. In mid-2000, the Architecture Foundation and the Exploratory also began to explore funding for a wider London-based project involving online community design and we were involved in proposing various extensions to projects that we had already developed as a basis for this. As part of these proposals, the development of online web-based resources for public participation in Woodberry Down emerged where the crucial issue was the development of multimedia content in sufficiently intelligible form for residents to make use of this in thinking about future design options for the community.

The WDRT decided to fund the project in late 2000 after they were convinced that we had fast enough multimedia methods which would deliver visual content to the site. We had been perfecting these techniques using an area of central London around the BT Tower, adjacent to our offices, and in an application for British Nuclear Fuels at Dounreay where they were mothballing part of their reactor. The Architecture Foundation acted as brokers through which the project could be run using their charitable status and in early 2001, the WDRT laid out preliminary ideas for the structure of the web site. A rough draft of the site was made and we then began to meet with residents to illustrate what might be done and to test the extent to which the media that we were proposing was acceptable to individual use where those concerned had only the most basic of IT skills.

The structure of the site is divided into four different areas. First there is information, mainly in the form of text about the process of regeneration which occupies at least half the site. Data in the form of reports can be downloaded from this area but the main focus is on explaining what is happening in terms of the regeneration process and informing the residents as to the situation with respect to their own housing. The second area is mappable information supported by panoramas which is currently quite exploratory in intent as eventually this will be used so residents can get some feel about what the future of the area might be like. This material makes use of fast multimedia and currently simply portrays the area as it stands. Residents may not get much from this although readers of this paper would do so; it illustrates what is possible with respect to seeing the area physically as communicated over low capacity bandwidths. The other two parts of the site are much more interactive. The third part

is a bulletin board of fairly standard form which enables anyone who is registered to post comments. The fourth is the most experimental. Currently this shows how different physical options for the future can be viewed in 3D, and manipulated in terms of showing how the existing form of the site can be changed. Four options are currently present. All this involves so far is zoom, pan, and move capabilities but once developed, it will allow residents to engage in their own designs and post their schemes to the WDRT and other groups with an interest in the future of the estate.

The first proposal was to use an internet map server to deliver maps online which residents could query. However then and now, it is not really possible to use typical map servers for the kind of purpose we have in mind here. Residents do not want to query a map but they do need to see visual information in 3D and 3D very quickly. They need to be able to do this over standard telephone lines. Thus although ESRI (UK) donated a copy of *ArcIMS* map server for this purpose, we quickly moved to much faster and simpler media, developing and using freeware/shareware based on various software products developed by *Viewpoint* (http://www.viewpoint.com/). In fact, the development of the web site and the testing of different media in a hands-on form with the EDC, represented one of the high points of a series of fairly acrimonious resident meetings. These mainly dealt with more pragmatic issues involving the process of regeneration but they were also used to demonstrate the site.

A particularly innovative feature of this project was the decision to directly engage the resident representatives in the EDC in the design of the web site. As part of the overall funding, monies were set aside to purchase enough computers and internet access to put each representative online with the computer and its access located in their own dwelling but with the agreement being that representatives would use their access to engage their wider community in the participation process. This decision was rooted in problems. The notion of a public authority providing residents with free computers, the fact that their usage could not be controlled, the requirement that representatives would engage those who they represented in their own homes – all these were highly controversial and debatable issues. The notion too that if representatives did not use their computer, they would be taken from them also raised difficult issues. As a result, the computers once purchased remained in a warehouse for 6 months before the Council agreed to their release. To an extent, the idea that homes would be wired

when those very homes would then be demolished or refurbished went against the grain. Yet it represents a far reaching issue – that to replace physical infrastructure one may need to add to that infrastructure before the replacement takes place.

The data base was constructed over a four week period in the early Spring of 2001. A massive number of panoramas were photographed at roof and ground level and these form the various visual sequences that are embedded in the web site. *Zoomview* and related products from Viewpoint, were used for fast animation, zooming and panning of the aerial photographic coverage of the site which is used as the basic locational referent. Essentially these products generate views using a data-streaming technique called 'pixels on demand' in which a scene is divided into a large number of small pieces, each piece delivered being dependent on the pan and zoom within the given window that is selected. The scene is quickly refreshed to produce the greatest detail but the user has a clear idea of what the overall scene looks like while this process is going on. The *Viewpoint Media Player* (*VMP*) is required for this but this is now common on many machines and comes bundled, for example, with *AOL*. It can be downloaded over a standard phone line in a couple of minutes and the request to do so is always activated when a Viewpoint scene is generated. The software enables IT designers to layer information too and to link the scene to other web-based software such as *Flash*. We decided very early on that *VRML* would generate 3D file sizes far in excess of what might be handled by a basic user and thus the focus of software on the site is no more elaborate than the fast graphics that can be read by *VMP*. In fact, to develop the site we had to collaborate with Viewpoint who were quite literally writing elements of their software while we were using it (Smith and Evans, 2002).

The initial site design was meant to run until April 2001 but because the graphics design team who produced a first draft of the site and the Woodberry Down logo were slow to start, a working prototype was not available until the summer. Four versions were developed during these months and this represented a detailed collaboration with WDRT and the Architecture Foundation over many issues. Moreover, involving the residents was painful at times. For example, although the EDC are central to the design of the web site, representatives wanted to remain anonymous with respect to their locations/addresses in case they were identified as those having free computers and their homes then burgled. This might seem fanciful to readers in other countries

but in east London, it is routine. The site was finally launched in November 2001 along with the exhibition of designs submitted as part of the *Europan 6* competition.

Every project needs a champion and the unsung hero of Woodberry Down was Micah Gold who not only drove the online web-site to completion but was the soul of the entire project. The infighting that dominates such projects is legendary. Funds are always in short supply, residents always disadvantaged, tempers frayed, and good ideas sink without trace. The decision to stop the computers being given to residents' representatives, which was only revoked in May 2002, hardly helped. Hackney's continuing bankruptcy in the face of hard central government performance targets, and the failure of various regeneration bids took their toll. Micah Gold resigned soon after the web site was launched to go to Greenwich to try the same. The second stage of the project was launched in early 2002 and the final web site went live in the spring about the time residents' homes were finally wired. As we will recount in our conclusions, the site is now online but is still plagued by a stop-go policy of chronic under-funding. As in many such projects, the problem of maintaining and adding to the web site has barely been addressed.

6 The Structure of Online Participation in Woodberry Down

As we illustrated earlier, many online resources for participation are one way; that is interaction by users is passive, being based on rarely anything more than email and comment forms. However in Woodberry Down, interactivity – two way communication between providers and users as well as between users themselves – is central to this process and the web site is thus configured to contain various comment forms, bulletin boards, animations, fly-throughs and pictorial manipulations. As the web site is continually under development and will evolve with the process of participation and the schedule of regeneration, we will soon add sketching facilities, as well as policy forums for online debate. In terms of the net of relations which determine the kinds of participation that can take place through the site, we show this in Figure 6 where it is immediately clear that the structure is strongly orientated towards low level but comprehensive interaction, is geared to online discussion, and

has a clear focus on community design. Professional experts and the community are the target users and providers although political representatives are also likely to feature in its use.
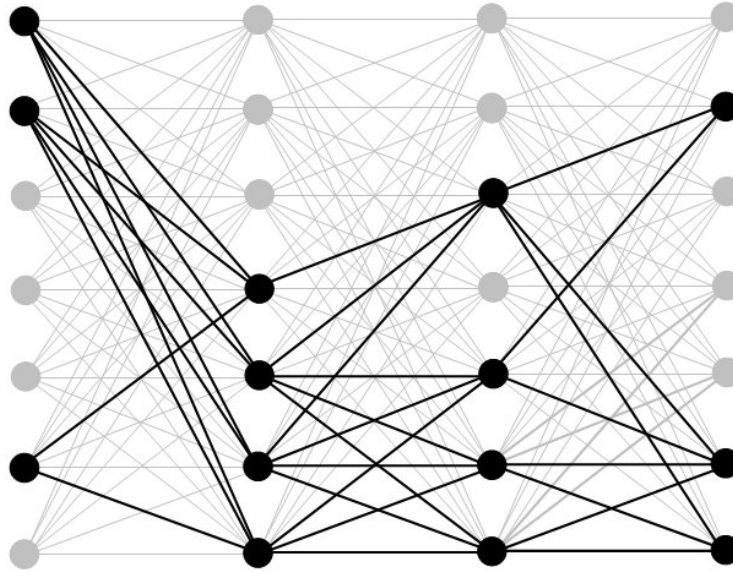

Figure 6: The Structure of the Woodberry Down Net

We would maintain that the structure of this site is more robust than several of those we have examined in that the foundations of the site in basic software and community interests provides a robust basis for its continued development, an essential requirement given the length and severity of the problems governing the local community.

The web site has a particularly simple organisation. Essentially there are four main types of information: *textual information* about the entire process of regeneration and the site itself, services, and related facilities; *multimedia* as maps and panoramas about the various component housing blocks which make up the estates; *design options* reflecting the kinds of designs that might be developed for the site; and a *discussion forum* which enables users to interact with the WDRT concerning any aspect of the regeneration process. Textual data forms the vast majority of information that the site is able to deliver and this is accessed as pages through various drop down menus accessible from the home page. These menus cover seven topics: What We Are Planning, 3D Virtual Tour, Regeneration and You, Your EDC, Background and Research, Community and Services, and Youth and Kids. We show a version of the

home page in Figure 7 which contains the design option which we will examine below, as an inset, showing how any user might access the home page of the site while also opening up other windows from the site itself.
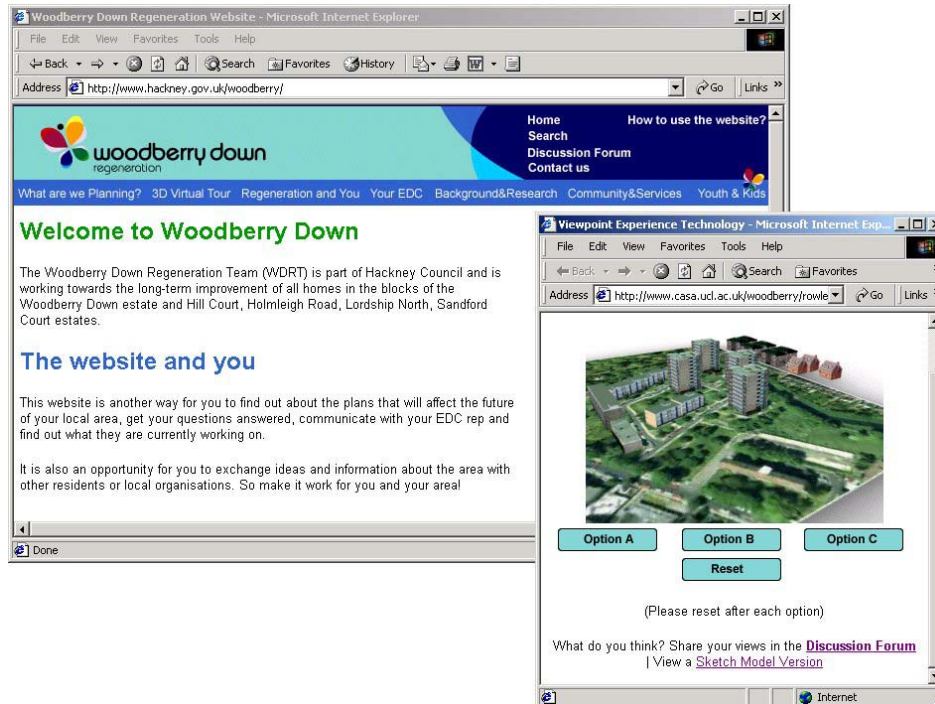

Figure 7: The Woodberry Down Web Site with Inset Window showing the Viewpoint Media for Exploring Various Housing Options

What We Are Planning gives access to four pages – relating to the vision for the future, the partnership which will enable the site to be developed through various private finance initiatives, yet to be chosen, the first stage of the works with access to the 'decant status' of the various housing blocks, and the planning brief. The process of regeneration is plagued by esoteric terminology and acronyms and under the menu associated with **Regeneration and You**, there is a section on 'frequently asked questions' (with answers), and a jargon buster which defines the various terms used by officials such as 'Basic Credit Approval'. There are links to the decant status page and to housing advice – links to other housing agencies from associated pages, while under **Community and Services**, there are links to housing management advice and local services, all which lead to their own pages. There is a section here that lets users provide the WDRT with information about local events. **Background and Research** provides a brief history of the area as well as key documents referred to as 'Yellow

Books' about the regeneration which can be downloaded as *Acrobat* PDF files. This illustrates the sorts of problems that we have had to grapple with. PDF readers are free whereas documents which are set up in *Word* files require the appropriate software, which is not free. Yet PDF is a much less intelligible format for the average user.

There is extensive information about the EDC accessible from **Your EDC** menu which gives information about the constitution of the committee, how often it meets, what it does, and its local representation. Pages dealing with **Youth and Kids** are under construction and currently simply display graffiti and such like in the environment. As the site is under active development, visual information about the existing site and future plans are contained under the **3D Virtual Tour** menu which lets users select from 104 blocks, load pannable and zoomable aerial photographic maps, and thence select digital panoramas of different parts of the site giving some feel for what the place is like now. These use the Viewpoint media introduced in the previous section. If the user zooms into an area of the map, then a panorama is loaded and using a sequence of point and click, this panorama can be opened up from a spherical window and the user can get some sense of the physical conditions and space of the housing in that area. Currently this facility is, as implied, a 'tour' in that it simply illustrates what is possible but in time we intend this to be integrated into the sketch planning capability which we are developing in another area of the site. In Figure 8, we shows typical examples of the visual panoramas and zoomable map layers that can be accessed for all housing blocks on the site.

The area of the site where we are developing the sketch planning capability planned to go online once the design options stage is really underway, is currently accessible under the Wired Communities menu item which appears in the drop down menu **Background and Research**. So far, we have only developed typical options for Rowley Gardens; there we present three options which enable the user to see the present configuration of housing blocks and to test three alternative designs which can be explored in 2D and 3D. The initial screen shows the existing housing which is composed of a mix of high rise blocks and low rise. The three options when activated replace the existing buildings thus giving the user a sense of how the estate would look. We need to do much more to make this effective but the tools are being

developed and we are encouraged by the fact that residents are excited by these possibilities. We show the existing housing and three options in Figure 9.
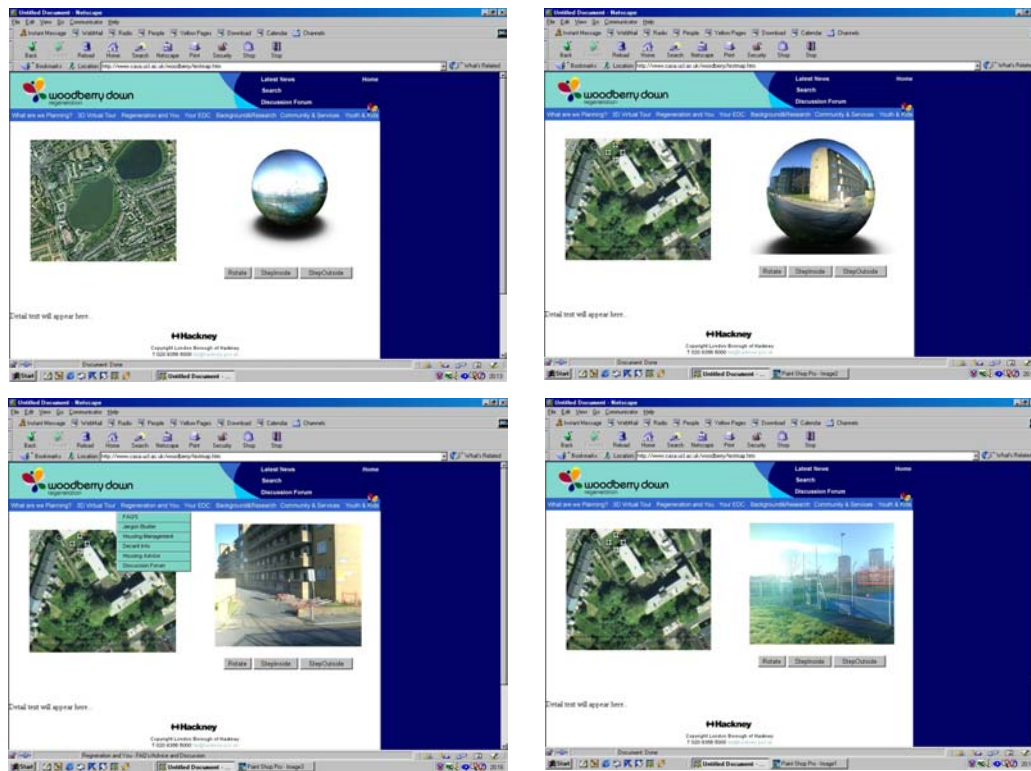

Figure 8: Accessing Different Housing Areas, Loading Panoramas and Moving About

The last feature we will note involves the Bulletin Board, or Discussion Forum. This feature went online in March 2002 and immediately residents began to post notes to the board. One if us (AH-S) acts as moderator and manages the site but once material was posted, then the WDRT needed immediate involvement. As many of the postings relate to services to be provided by the Council as part of their role as landlords of public housing and as many of the messages are critical, it was ultimately resolved that because of legal reasons, the WDRT were barred from responding for fear of litigation. This is a major obstacle to the very notion of participation and it shows no sign of being resolved. It further reinforces the general feeling amongst many residents that local government is hostile, remote, uncaring and even malicious and this does not bode well for the process. To give some idea of the issues, in Figure 10, we reproduce a typical message from a user to give an idea of the power of discussion as well as the nature of the argument.
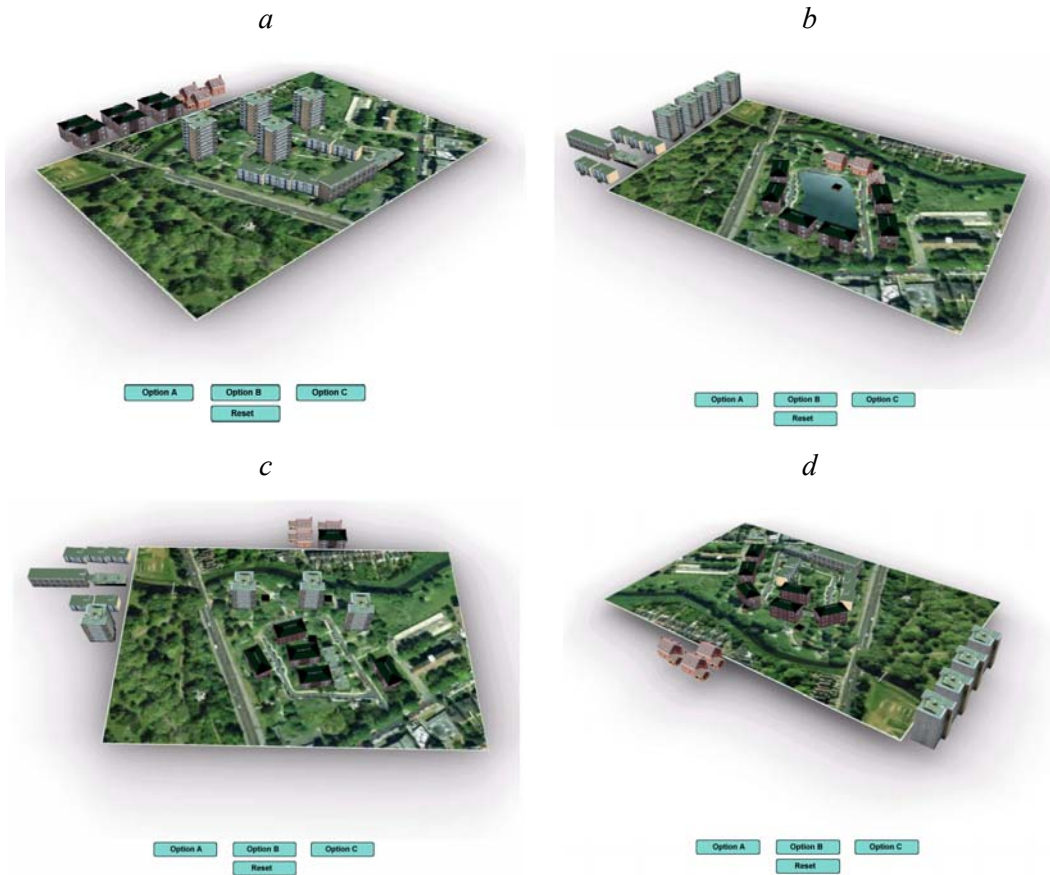
a   *b*

c   *d*

Figure 9: Options for the Redevelopment of Rowley Gardens
When a user clicks on one of the options, the current configuration of housing at a) above moves to the side of the map and new housing options automatically assemble themselves in b), c) and d)
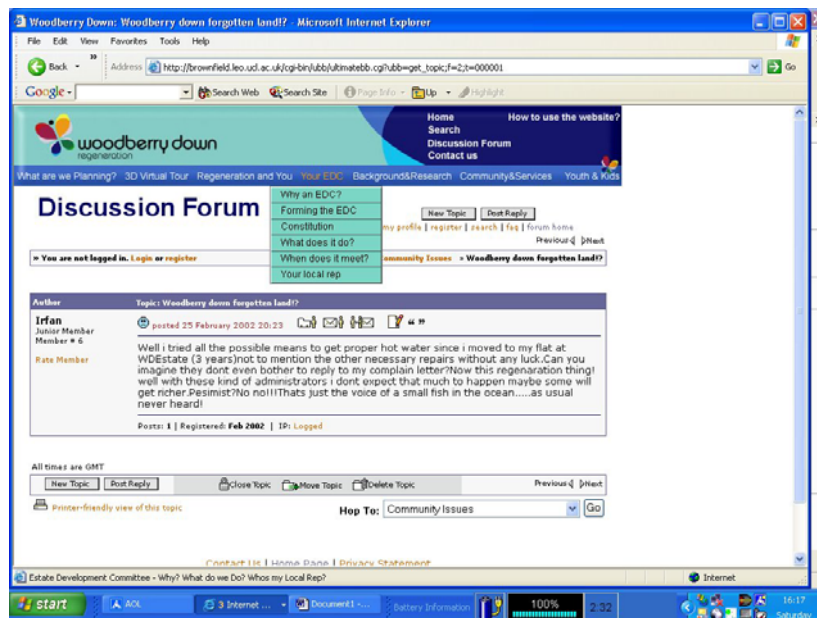

Figure 10: The Discussion Forum with a 'Typical' Message

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7 Conclusions: What Next ?

One of the key issues emerging from this paper is the need to develop participation which is truly interactive. This is no more or less than two-way dialogue where providers of information respond to users and where users respond to providers in an ongoing collaborative process. This is easier said than done. Most participation schemes tend to be short-lived, somewhat passive in which information is provided and sometimes meetings held to engage those affected but any dialogue often takes place too late in the process for any effective action on the part of the community. In online participation, and in the smaller but distinct subset of activity in providing mapping to the community – in PPGIS for example – the challenge is even greater as the media is unfamiliar (Weiner, Harris, and Craig, 2001). The nature of this media is such that there needs to be active use and provision. Often participation schemes are financed as one-off ventures but in the case of web-based dissemination, it is essential to provide the greatest funding for ongoing development and maintenance of the media.

The development of any web site needs to be a continuing affair as it is a portal for information which is continually changing. It might even be argued that if the context is to provide those affected with information where none has been provided before, then there are better ways than the web. Leaflets through doors is the classic example in public participation. But where there is the need to involve the community, then web-based methods are attractive in that they can incorporate response and they can chart and communicate changing circumstances. In the Woodberry Down project, the singly biggest problem is not convincing the WDRT or the community of the need for such continuing involvement. It is finding continuing sources of funding for this participation where it is widely recognised that this is but one strand in a much wider portfolio of participatory activities. The very existence of the regeneration team in the local community is a kind of participation and this online venture has to compete with all these alternatives and complements. Currently the project awaits further funding with the web site maintained and updated by ourselves as a labour of love.

Yet there is the real prospect that the work will continue as more and more residents acquire computers and as much of the rest of the world gets wired. It is important to note the mission of the WDRT when they say: " … the WDRT believes that it needs to build a trusting working relationship. A real partnership, with residents. It is certain that when it comes to involving the local community in the regeneration, the quality of their involvement in the process may well be more important than the final outcome of many key decisions" (WDRT, 2001a, page 18). Online participation is a central construct in achieving these goals.

8 References

Arnstein, S. R. (1969) A Ladder of Citizen Participation, **Journal of the American Institute of Planners**, **35**, 216-224.

Batty, M. (1971) Teaching the Arts of Simulation, **Education for Planning Association Newsletter, 1**, 22-24.

Batty, M. (1980) Computers and Design, **Papers in Planning Research, 2,** UWIST Department of Town Planning, Cardiff, UK.

Batty, M. (1991) New Technology and Planning: Reflections on Rapid Change and the Culture of Planning in the Post-Industrial Age, **Town Planning Review**, **62**, 269-294.

Batty, M. and Smith, A. ((2001) Virtuality and Cities: Definitions, Geographies, Designs, in Fisher, P., and Unwin, D. (Editors) **Virtual Reality in Geography**, Taylor and Francis, London, 270-291.

Batty, M., Chapman, D., Evans, S., Haklay, M., Kueppers, S., Shiode, N., Smith, A., and Torrens, P. (2001) Visualizing the City: Communicating Urban Design to Planners and Decision-Makers, in R. Brail and R. Klosterman (Editors) **Planning Support Systems: Integrating Geographic Information Systems, Models, and Visualization Tools**, ESRI Press, Redlands, CA, 405-443.

Bullard, J. (2000) Sustaining Technologies? Agenda 21 and UK Local Authorities' Use of the World Wide Web, **Local Environment**, **5**, 329-341.

Carver, S. (2001) Participation and Geographical Information: A Position Paper, **ESF-NSF Workshop on Access to Geographic Information and Participatory Approaches Using Geographic Information**, Spoleto, Italy, December, 2001; available at http://www.shef.ac.uk/~scgisa/spoleto/carver.pdf.

HACAS Chapman Hendry (2002) **A Picture Tells a Thousand Words** (Computer Empowerment for Regeneration: Virtual Reality and Computer Animation), HACAS, London available at http://www.hch.eu.com/publications/vr/vr/vrdlfiles.htm.

Haklay, M. and Tobon, C. (2002) Usability Engineering and PPGIS: Towards an Improved Learning Cycle, **Proceedings of the First Annual URISA Conference in PPGIS**, Park Ridge, IL, 61-79.

Healey, P. (1997) **Collaborative Planning: Shaping Places in Fragmented Societies**, Macmillan, Basingstoke, UK.

Jankowski, P., and Nyerges, T. (2001) **Geographic Information Systems for Group Decision Making: Towards a Participatory Geographic Information Science**, Taylor and Francis, London.

Kingston, R. (2002a) The Role of e-Government and Public Participation in the Planning Process, **XVI AESOP Congress**, Volos, Greece, July 10 – 14, 2002 at http://www.ccg.leeds.ac.uk/democracy/presentations/AESOP_kingston.pdf

Kingston, R. (2002b) Web-based PPGIS in the United Kingdom, in W. J. Craig, T. M. Harris, and D. Weiner (Editors) **Community Participation and Geographic Information Systems**, Taylor and Francis, London, 101-112.

Laurini, R. (2001) **Information Systems for Urban Planning: A Hypermedia Cooperative Approach**, Taylor and Francis, London.

Meszaros, P. (2001) Bradford Community Statistics Project, **Local Economy**, **16**, 326-328.

Peng, C., Chang, D., Blundell-Jones, P., and Lawson, B. (2001) Dynamic Retrievals in an Urban Contextual Databank System using Java-CGI Communications, in B. de Vries, J. van Leeuwen, and H. Achten (Editors) **Proceedings of Computer-aided Architectural Design Futures 2001**, Kluwer, Dordrecht, The Netherlands, 89–102.

Power, A. (1998) **Estates on the Edge**, Palgrave Macmillan, London.

Rydin, Y. (1999) Public Participation in Planning, in B. Cullingworth (Editor) **British Planning: 50 Years of Urban and Regional Policy**, Athlone Press, London, 184-197.

Schroeder, R., Huxor, A., and Smith, A. (2001) Activeworlds: Geography and Social Interaction in Virtual Reality, **Futures**, **33**, 569-587.

Smith, A., Evans, S. (2002) A Collaborative Three-Dimensional GIS for London: Phase 1: Woodberry Down, in Kidner, D., Higgs, G., and White, S. (Editors) **Socio-Economic Applications of Geographic Information Science**, Taylor and Francis, London, in press.

Smith, A. H. (2001) 30 Days in Activeworlds - Community, Design and Terrorism in a Virtual World, in Schroeder, R. (Editor) **The Social Life of Avatars: Presence and Interaction in Shared Virtual Environments**, Springer-Verlag, Berlin, 77-89.

WDRT (2001a) **Community Leadership at Woodberry Down**, Woodberry Down Regeneration Team (http://www.hackney.gov.uk/woodberry/pdf/community.pdf), Hackney, UK.

WDRT (2001b) **Vision, Objectives and Procurement** (2nd Edition), Woodberry Down Regeneration Team (http://www.hackney.gov.uk/woodberry/pdf/vision.pdf), Hackney, UK.

Weiner, D., Harris, T., and Craig, W. (2001) Community Participation and Geographic Information Systems, **ESF-NSF Workshop on Access to Geographic Information and Participatory Approaches Using Geographic Information**, Spoleto, Italy, December, 2001; available at
http://www.spatial.maine.edu/~onsrud/Spoleto/WeinerEtAl.pdf.