UrbanBuzz
Building sustainable communities

Project

Socio-Environmental Disorder & Urban Configuration (SEDUC)

Report

Crime and Community

A Review of the Design and Mapping Context for Practice Guidelines

By

The CASA Team, University College London

Project Aims and Background

The SEDUC project is part of the HEFCE and DTI–funded UrbanBuzz programme – a programme run by UCL in partnership with UEL – funded under HEIF 3 – Building Sustainable Communities. Building Sustainable Communities brings a network of Innovation Fellows and Business Fellows together from academia, business and government to work on live development projects – bringing their combined expertise and knowledge to bear towards the development of sustainable communities.

Project SEDUC's lead team is UEL is working in partnership with UCL, (Bartlett School and CASA) along with the London Boroughs of Tower Hamlets, Newham and Barking & Dagenham.

'Sustainable communities are safe, perceived as safe (low levels of fear) and are attractive (low levels of disorder). Anti-social behaviour (ASB) and physical disorder can thus be viewed as barometers of sustainability. Areas of high ASB usually have high levels of deprivation and these same areas are associated with higher levels of environmental disorder such as dumped cars (stolen), rubbish and damaged street furniture. Together these attract crime, promote insecurity and fear of crime among residents, and erode community cohesion. Local Authority data sets such as 'FLARE' record all aspects of reported ASB and physical disorder in the environment. Analysis of such data alongside the configuration of the built environment (space syntax) informs thinking about effective interventions that feed into physical and social infrastructure planning, and community safety.

The project has four broad aims:

- to put in place automated methods of data preparation and geocoding of 'FLARE'-type data sets ready for analysis;
- to promote the generic use of space syntax software in planning and specifically in the analysis of ASB and physical disorder against metrics of the configuration of street networks;
- to use these analyses to inform appropriate responses for minimising recurrence of ASB, design against crime and fostering community cohesion – to be brought together in a practice guide;
- to deliver the necessary knowledge transfer through capacity building and skills enhancement in the Boroughs in order to make these sustainable activities so that Local Authorities can continue to respond to the dynamics of ASB and physical disorder.'

Web Site: http://www.uel.ac.uk/geo-information/SEDUC/

Abstract

This Report contributes to the third aim - the development of a practice guide for communities responding to crime in their local neighbourhood. We review the way government policy, design theory and market demands have all extended responsibility for crime deterrence beyond the traditional policing professions to designers and consumers. These changes generate an increased need for accessible shared information to allow collaborative working for communities, planners and designers. In this report, we draw lessons from a range of work on community mapping projects undertaken over time by CASA researchers.

Part One sets the context of crime deterrence through design, planning and popular involvement. The view offered here is that the dominant locus of responsibility for crime deterrence has moved quite frequently in recent history from the local community and local policing to central government and then to the designer, planner and architect and back again. Crime deterrence has moved through models of surveillance, exclusion and segregation, to security-based design briefs for products such as cars and street furniture and finally to the empowerment of individuals and the masses through interactive geographical information.

The following two parts of the report focus on this emerging area of community involvement through interactive websites. The report follows the history of internet use in crime deterrence through a selection of projects in which CASA researchers have been involved.

Part Two introduces CASA's local community crime reporting system **Community Alert** set up before the advent of **Google Maps**. This project is an interactive local mapping system but without the data sharing capacity of Web 2.0. However as it is built in widely used and available software it has lasting importance for local communities.

Part Three looks at post-Google Web 2.0 CASA projects that promise enhanced public access to information, considerably more public control and real opportunities both to hold the police to account and collaborate in setting local priorities for security and policing.

Part Four draws conclusions as a contribution to the development of a good practice guide for neighbourhood mapping and community involvement in crime deterrence.

The CASA Team

The following individuals contributed to the report: Andy Hudson-Smith, Sonja Curtis, Michael Batty, Susan Batty, Alex Singleton, Maurizio Gibin, Paul Longley, and Muki Haklay

Part One: Crime, Planning and Design

1.1 Three approaches to crime deterrence

There is a long history linking crime and urban form in the built environment. We typically associate crime with specific urban forms: high densities, diverse inner city communities and mixed land uses; paradoxically, the very characteristics planners and architects now favour as essential elements of the sustainable city. Over time, this paradox has led to some interesting twists and turns in the architect and urban planner's response to designing out crime. Three quite different approaches to crime deterrence through design can be identified: surveillance, product design and public information.

Surveillance
Bentham's Panopticon, a model prison never built, is often used as the supreme example of surveillance in prison architecture; designed in 1785, the prison form ensures an almost Godlike power of oversight along straight paths radiating from the supervisor's central position (see Figure 1.1).

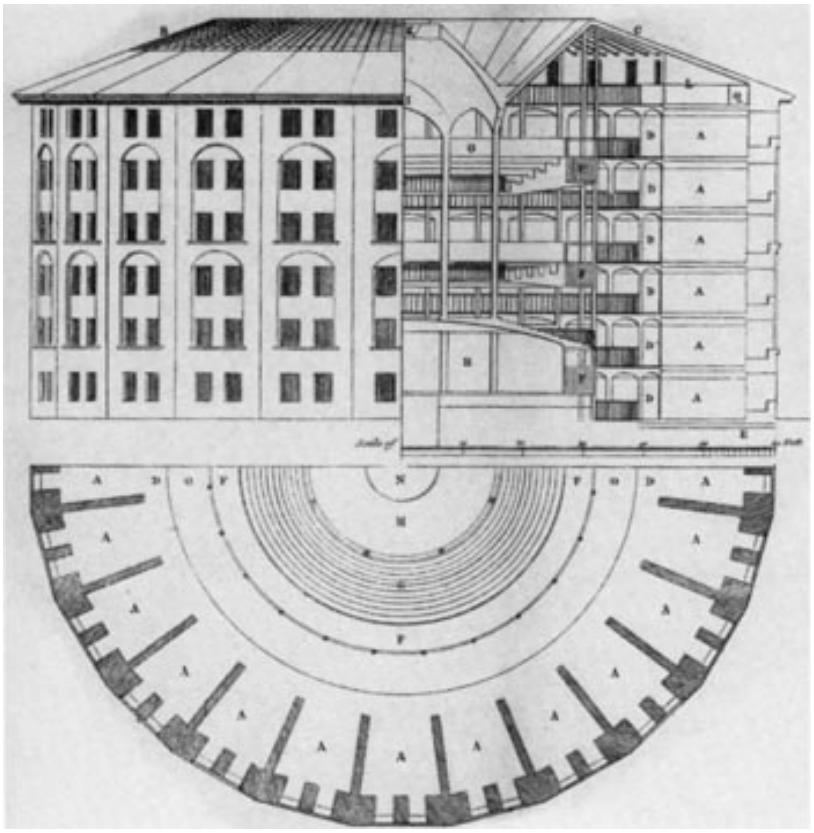

***Figure 1.1**: Bentham's Panopticon*

Described by Foucault as "a cruel, ingenious cage", the design was arguably as controversial as the present-day equivalent, the U.S. Camp X-Ray at Guantanamo Bay (Figure 1.2). But urban surveillance

now extends from the oversight of the criminal to that of the potential criminal with extensive use of CCTV cameras in the urban environment through to loudspeakers issuing on-the-spot warnings to those dropping litter or loitering. Surveillance remains a controversial form of architectural crime fighting.

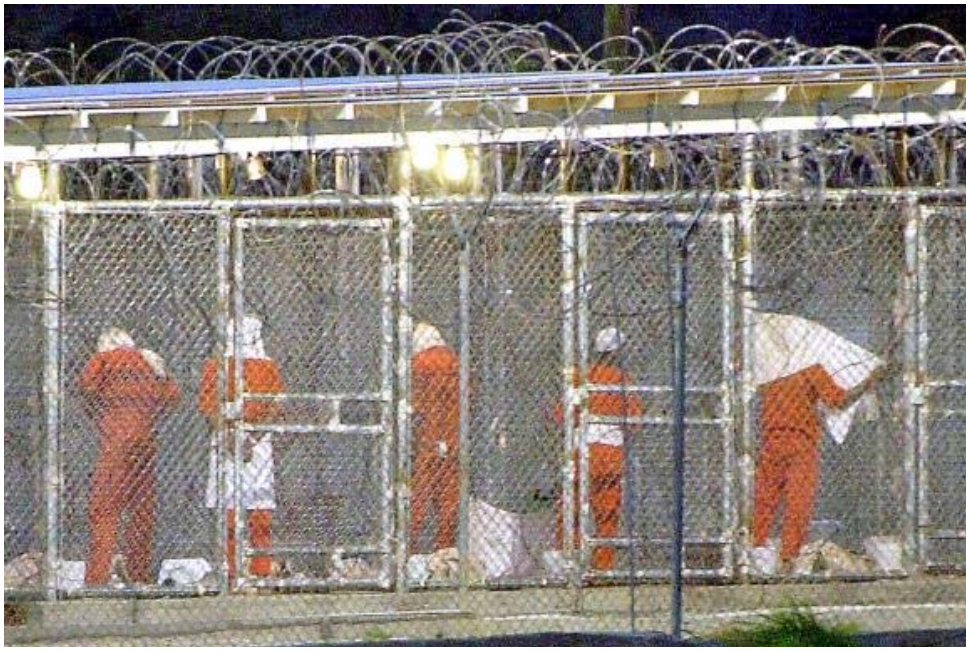

***Figure 1.2**: X-Ray Camp at Guantanamo Bay Cuba*

From a very different perspective in the early 1970's, Oscar Newman introduced his concept of 'defensible space' (Newman 1972). Using the idea of crime deterrence through surveillance, he argued that the twin concepts of visibility and community responsibility should be used by urban designers to create secure local environments. Visibility alone was not enough; residents had to feel a sense of individual control and ownership in an area. Very high densities and large estates were seen as increasing the number of people in an area, reducing the personal sense of responsibility and thus the level of security.

"[The] defensible space concept has helped communities in St. Louis, Dayton, and elsewhere redesign neighborhoods for greater safety…we reorganized Five Oaks into 10 mini neighborhoods: cul-de-sac streets with gates to block the heavy through-traffic that had plagued the area. Within the next two years, overall crime fell by 25 percent and violent crime by 50 percent…while crime had increased 1 percent in Dayton overall". (Newman 1997)

But it is here that Newman's use of surveillance begins to run counter to our current interpretations of sustainability that call for a diverse and mixed use community. He advocated the territorial separation of communities; we would now identify these as gated communities in more affluent areas, but the same idea was adopted by residents

using cheaper concrete barriers to close off streets in poorer suburbs. Newman argued that the defensible concept was being applied incorrectly - but the principles were the same: territories should have similar people, similar land uses and clear demarcation; strangers are treated with suspicion and given little reason to enter the area. By 1998, in spite of the apparent impact on crime levels, residents in Bridgeport Connecticut – one of Newman's redesigned communities - were asking for the removal of the unsightly barriers (NHI 1998).

However, a different interpretation of the surveillance model of crime deterrence argues for the maintenance of a vibrant, overlooked and busy street environment – diverse, compact and high density. This has become a common requirement in town planning development control decisions in the UK. A typical example reported in Planning (2008) is given here:

DC Casebook: Commercial and Industrial.
Council overruled on catering use bid.

An inspector has allowed the change of use of the ground floor of a former brewery on a Bristol quayside to offices after finding that an extant planning permission for food and drink use is unlikely to be implemented. The council felt that there was an excessive concentration of office uses in the area. The inspector was unconvinced, observing that there was residential accommodation in the upper floors of the building and in nearby premises. However, he offered considerable support for the council's objective of seeking uses that promote greater activity in the area, especially in the evening. He saw that the area was very quiet and lacked natural surveillance, a situation that was likely to foster a fear of crime.

The council acknowledged that the site's position and lack of passing foot traffic limited its attractiveness but argued that when an adjacent redevelopment opened this situation would alter. The inspector accepted that a food and drink outlet would give the area vibrancy and could improve safety and security. He found that the weight of argument favoured retaining this option but agreed that the likelihood of such a use coming forward was a key factor.

Designing Out Crime:
By the early 1990's, policy on crime and design was focusing on two themes:

- Collaboration between agencies and between agency and community; and

- A strong reliance on design (both in terms of product and environment) to reduce the opportunity for crime.

The important role of Planning and Urban Design in crime deterrence was signalled by Circular 5/94: *Planning Out Crime* and strengthened by the establishment of the Secured by Design programme and awards. The early 1990's also reinforced inter-agency working following the Morgan Report on crime reduction (1991) and programmes such as *Secured By Design* (SBD) developing collaborative working between planners and the police. After 1994, much of the advice in *Planning Out Crime* became the accepted wisdom for sustainable planning and community regeneration. So much so that the advice was eventually incorporated in Planning Policy Statement 1: *Delivering Sustainable Communities* (PPS1). The importance of well populated, compact cities, mixed uses ensuring vitality, community responsibility and passive surveillance; the return of residential uses to the city centre and the enhancement of the night economy alongside the move to 24 hour cities are all valuable aids to repopulating vulnerable areas and reducing the fear of crime. *Planning Out Crime* made the point that crime prevention can be a material consideration in the determination of planning applications. However, the most significant point was that crime prevention had to be designed into the development from the outset. Once development is completed many opportunities to reduce crime can be lost.

The early 1990's also reinforced inter-agency working following the Morgan Report on crime reduction (1991) and programmes such as *Secured By Design* (SBD). Many communities and agencies spontaneously implemented the Morgan Report (1991) (although not officially adopted by the Government) which stressed the need for planning, police and community collaboration - a notion that was also at the heart of urban regeneration and SRB bidding processes of the time.

By 1998 the Public Transport Crime and Disorder Act was requiring Local Authorities to anticipate crime; to 'design out' crime. But, by the 1990's, it was not only planners and architects who were expected to routinely consider crime and disorder as part of their brief, but also product designers. Designers of cars, street furniture, mobile phones and a variety of other products were expected to collaborate with police and to share responsibility for security and safety. Indeed, much of the responsibility for the decrease in certain types of crime (such as car crime and some forms of theft) can be claimed by product designers.

As we approached the Millennium, planners and urban designers saw their role in fostering sustainable communities defined more clearly (DETR 2000) with crime deterrence and the reduction of anti-social behaviour as essential elements. The Urban White Paper – Our Towns

and Cities (DETR 2000) – set out the current consensus on the characteristics of the sustainable city; mixed use, diverse cities with vibrant centres and 24 hour activity. Planners have now moved far from their 1947 origins where they planned tidy single use zones; removed 'non-conforming' uses from residential areas and controlled the excesses of high slum housing densities. The concept of the green-belted compact city is re-emerging along with a call for higher densities to 'save' green land and improve the efficiency of public transport. But contradictions still exist. A fine line must be drawn between densities and levels of diversity that will ensure vibrancy and sufficient activity for security and those providing sufficient space and commonality of culture to maintain privacy and local confidence. However, by 2004 Hazel Blears was telling planners that "they need to do more". (Blears 2004). While acknowledging the good work being done particularly in some of the New Deal communities, the Home Office was clearly asking for considerably more responsibility to be taken by built environment professionals.

Also at the turn of the century, product designers were brought on board through collaborations between the Design Council, the Home Office and the DTI, in a programme launched in 1999. (Design Council 2002). *Cracking Crime Through Design* (Design Council 2001)) developed an emphasis on crime deterrent product design including protection against ID theft, internet crime and theft of 'hot' products often by rendering goods unusable when stolen. The Design Council cites case examples ranging from secure 'hot products' and slash-proof handbags to graffiti proof bus shelters and safe parks (Design Council 2001). Crime resistance is now included in the training syllabus for designers and design students.

> "innovative new designs [have been developed] to stop graffiti and vandalism. Glass, barrel-roofed design to make users feel safe and to deter groups loitering and scaring others. "Before, the bus shelters would get coated in graffiti and we'd never hear a dicky bird. Now if one of the shelters doesn't get cleaned one week, folk are on the phone straight away!" (Design Council 2002)

Finally and most recently, our attention has been turned towards the perception of crime, in particular an increasing fear of young people. Barnardo's report (2008) highlighted this as a growing and exceptionally important trend. The charity's chief executive Martin Narey is quoted in BBC News Online (BBC November 2008) as saying "It is appalling that words like animal, feral and vermin are used daily in reference to children."

The most important approaches to this urgent problem involve:

- Dealing with segregated 'no-go' areas whether exclusive or sink communities; and

- Improving public information sources and knowledge - with the consequent increase in confidence in the police and other crime and disorder controlling authorities.

Public Information
Most recently, the trend has moved back to the idea of personal responsibility, but this time with less dependence on physical barriers, exclusion and segregation or designer security. Now the focus is on an informed and confident public using the power of the internet and moving towards the use of the interactive and collaborative capacity of Web 2.0:-

> "The public need to be informed. Evidence shows that when people feel informed about action being taken to tackle anti-social behaviour they have significantly more confidence in their local police and local authority than those who do not. There is a real benefit to you in getting this right. We need to create stronger communities – ones where people are informed about what action is happening to address their concerns, where people feel it is worth them taking the time to pick up the phone, go to a residents' meeting or put a youth night on for the local kids – and the key to making this happen is communications." (Home Office 2008)

Figure 1.3 *"Anti-social behaviour is any aggressive, intimidating or destructive activity that damages or destroys another person's quality of life" Home Office (2008)*

The argument here is that information – knowledge – is most likely to bring with it enhanced levels of individual responsibility along with raised confidence, and associated with this the development of responsible attitudes and skills. This pattern of change in our response to crime – towards tackling crime through changing the

values and attitudes within society - is apparent in the change in Government policy. The Together and Respect campaigns initiated in 2004 encouraged just such an approach and focused primarily on stopping anti-social behaviour through a mixture of education and information, policing and anti-social behaviour orders (ASBOs), community and youth support (Home Office 2006).

By 2008, the emphasis on community partnership was reinforced in the crime strategy *'Cutting Crime: A New Partnership* (Home Office 2007), containing a commitment to provide access to more and improved local crime information for the public. Under this initiative a programme of interactive local crime maps for all neighbourhoods in England and Wales was announced in 2008 by the Home Office (BBC August 2008).

These new maps are intended to: " *allow the public to:*

- see where and when crime has happened, down to street level for some crimes;
- make comparisons with other areas; and
- learn how crime is being tackled by their local neighbourhood policing team." (Home Office 2008)

In particular, public access to the maps is intended to allow the public to hold police forces to account with the public becoming involved in setting priorities in an informed way. Both the old style paternalist style of policing and the newer confrontational model are intended to give way to a new mutual understanding of shared responsibilities.

> "…we have found that in some cases Londoners' perception of crime is higher than the reality and the crime maps may help to reassure communities about the general safety of their local area" Deputy Commissioner Sir Paul Stephenson. (BBC September 2008)

1.2 Conclusion

As the public and governments continue their adaptation to a risk society, responsibility for our security and protection has become increasingly blurred. The traditional policing role is increasingly shared between sectors: individuals; product designers; urban designers; telecommunications and news media and the growing industry in security and surveillance products both on and off-line.

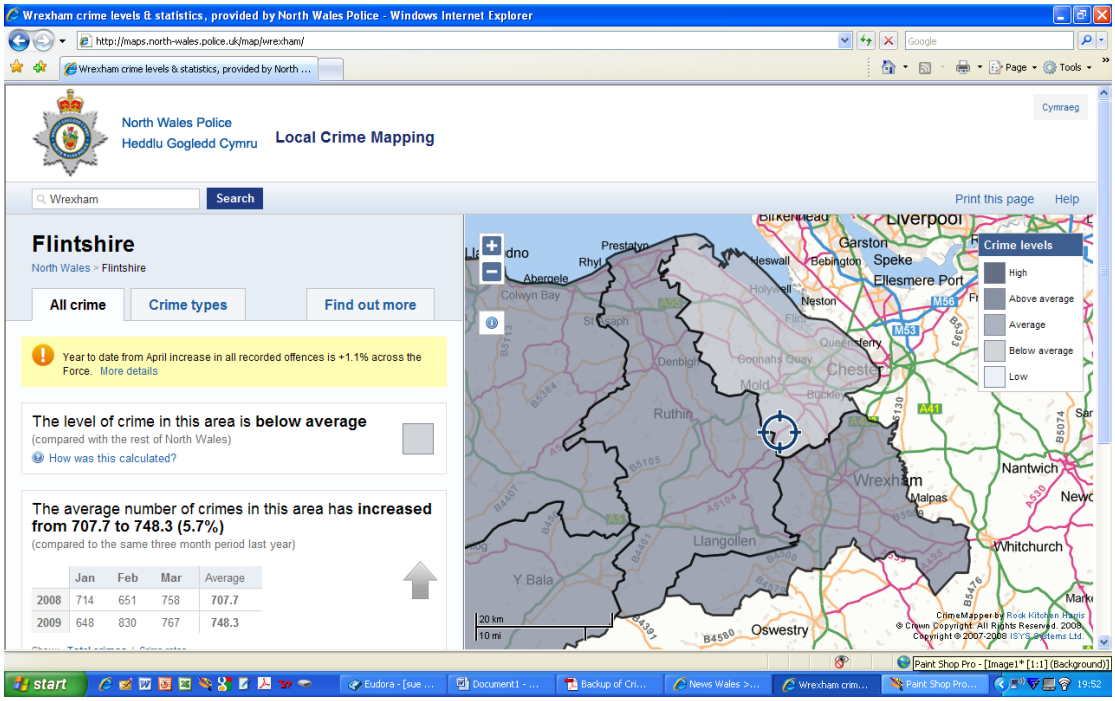

***Figure 1.4**: Welsh interactive crime maps were launched in December 2008. These maps are intended to strengthen community engagement. (BBC December 2008)*

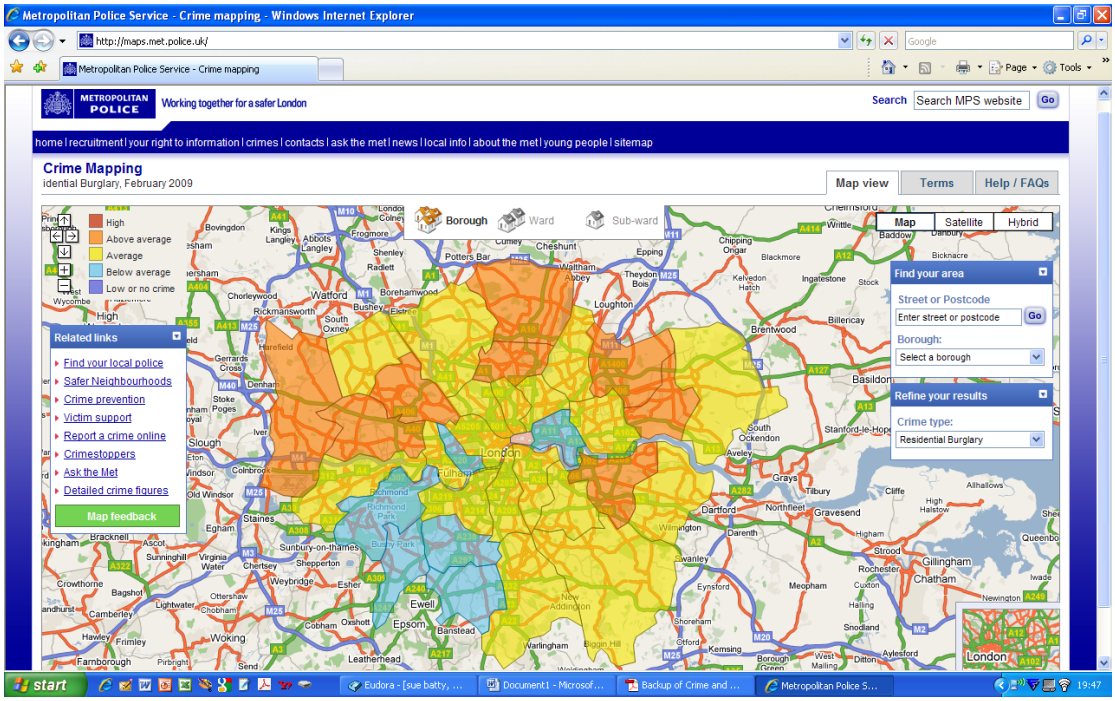

***Figure 1.5:** London crime maps were launched 3 September 2008: (BBC September 2008)*

This has contradictory effects. Personal responsibility when associated with confidence in police, community and government can only be helpful in the fight against urban and environmental crime. However, inappropriate use of technology and surveillance can lead to suspicion and reduced cooperation; confused responsibilities can lead to the breaking down of traditional competencies and skills and a reduction in public confidence. A growing fear between sectors of society may create no-go areas in the city by excluding some sectors of the community. City centres become unapproachable by older citizens and families; public open space becomes unusable for the very young or the elderly; gated estates or sheltered villages for the elderly block traditional routes to other parts of the city; and housing estates cannot be entered by non-residents or rival gangs. The story of distrust and fear expressed in the Barnardo report can be seen at least partially as the failure of planners and developers to understand the impact of design on social space or to draw the fine line between space for quiet privacy and sufficient activity to ensure surveillance. Equally, this apparent inter-group distrust suggests the failure of government to engender knowledge and confidence through locally relevant information.

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Part Two: Community Alert: A Local Reporting Service for Detecting and Recording Anti-Social Behaviour

This part of our report provides an example of community involvement in crime hotspot identification via a project known as 'Community Alert' which in many ways pre-empts the concept of Web 2.0 and community action. As we have seen crime has an inherently geographical phenomenon. For a crime to occur it involves an offender and a suitable target to come together at a location. Understanding the role that this location has and the importance of other geographical factors that result in why a crime happens (e.g. the neighbourhood characteristics of the area from where an offender comes from) can offer vital clues that contribute to improving how we respond to crime problems. These responses could include those specific to policing and partnership approaches to crime reduction, but also to support other area based initiatives such as neighbourhood renewal.

The Jill Dando Institute at University College London define crime mapping as the direct application that comes from considering the inherent geography in crime. Crime mapping supports a number of processes that include;

- Responding and directing police and community warden, calls for service, and information collection. Many police forces use detailed gazetteers of addresses and locations with computer mapping to help them identify where a response is needed and become consistent in address data capture. This also helps to solve any ambiguity over the exact location where an incident has happened. Community wardens are also using mobile computing with global positioning system (GPS) technologies to capture details of graffiti and vandalism incidents.

- Supporting the briefing of operational police officers by identifying crimes that have recently occurred in the areas they have patrolled or are soon to patrol, and what may happen in the future. The COMPSTAT process uses crime mapping at its heart to help to effectively inform what has been happening on the streets, where patrolling resources need to be deployed, and to support the monitoring and performance of any targeted actions.

- Identifying crime hotspots for targeting, deploying and allocating suitable crime reduction responses. The analysis of persistent crime problems has been used by many CDRPs to help identify, target and prioritise suitable areas for crime prevention initiatives such as CCTV and burglary reduction programmes.

- Through pattern analysis with other local data, helping to effectively understand the crime distribution and explore the mechanisms, dynamics and generators to criminal activity. Crime maps can be used with data on housing, deprivation, demography and the location of local services to help in planning and designing other local strategies such as those for neighbourhood renewal and community cohesion.

- Catching serial crime offenders: Geographic profiling is a tool used by the National Crime and Operations Faculty to help determine the most probable residential location (or other anchor point location, e.g. work address) of serial serious crime offenders.

- Monitoring the impact of crime reduction initiatives. As part of the evaluation of burglary reduction initiatives in England, crime mapping was used extensively to help monitor and evaluate what has worked and what hasn't.

- Using maps as a media to communicate to the public crime statistics for their area and the responses that are being implemented to tackle crime problems. Many parts of the UK are releasing crime statistics via internet mapping sites to allow local residents to access up-to-date information about what is happening in their neighbourhood.

If we can understand more about why certain places act as popular locations where offenders offend (i.e. crime hotspots), why certain areas breed more offenders than others, and why certain places or people are more vulnerable than others, then we can begin to more effectively get behind why crimes happen, become more intelligent in our policing, and design our operational policing, crime reduction and prevention responses to be more successful.

Community Alert was an early approach to collaborative data sharing on the net providing a community mapping resource with information on local crimes and concerns contributed by residents. Community Alert was developed in association with the Bloomsbury Improvement Group and the Metropolitan Police. Specific credit must be given to Jim Murray of the Bloomsbury Improvement Group for initiating the project due to a number of identified needs at that time.

The first of these needs identified a distinct lack of data and inconsistency of reporting and recording between the community and the authorities in relation to community concerns about anti-social behaviour. This was particularly evident in relation to drug related anti-social behaviour in the Bloomsbury district. In addition a lack of public awareness and understanding of the philosophy of Problem Orientated Policing & Intelligence Led Policing has contributed to

misconceptions about police response to low grade anti-social behaviour incidents. A community based system was viewed as acting as a central link between the Police and the local residents, the concept in many ways can be seen as similar to Neighbourhood Watch with the addition of online access and a geospatial element. Through links to community groups it was determined that the public were not satisfied with current methods of communicating incidents of anti-social behaviour to the police due to amongst other issues– unhelpful telephone operators, answer-phone machines that are full or don't allow enough time to make a report, inconsistent response from local sector offices and community officers, and 'no response' because of low grading of anti-social behaviour incident types. As such confidence needs to be regained in the wider community to take a stand against anti-social behaviour, by ensuring victims and witnesses have access to the support they need.

Consultation with the Bloomsbury community via public meetings led us to believe that a 'community-led' Grass Roots approach was required and this should be the driving force behind Community Alert – based on the principle that it is the local community that knows and understands best what is happening on our streets. As such we came to the conclusion that an internet based mapping and text anti-social behaviour incident reporting system would fulfil our criteria.

At that time the most advanced system for reporting incidents online was purely text based system known as Safety Net by the Centre for Community Interest, New York. As a phase one we negotiated use of their software to run a small pilot trial in Bloomsbury, London. The small scale test was successful in that it attracted interest and the support of key players in the community. With this in place it was decided to develop the infrastructure to fund, build and test a bespoke map based system on a ward geographical scale.

Central to the success of such community based systems is communication between all parties involved, from shop keepers to institutions and through to home owners, tenants and workers. As a key activist Jim Murray examined the local community, business and institutional infrastructure in the Bloomsbury ward and found it to notably fragmented. Indeed no joined up communication process whereby individual groups could communicate with the majority of other groups, whether resident, business or institutional was identified.

In order to remedy the situation an umbrella group formed – The Bloomsbury Improvement Group to act as the bridge between the business, institutional and resident community – attached to that we helped set up a large autonomous sub group at manager/operational level called Bloomsbury Joint Security Group in partnership with the police.

The Bloomsbury Joint Security Group involved the main community association (which in turn links in to the local Community Neighbourhood Forum of resident groups), institutions, businesses, student union's, land owners, property managers, tenant associations and commercial security managers.

With a core focus in place the group negotiated and established communication protocols with the local Police Community Intelligence Unit, Police Sector Unit, Police Partnerships Unit, the borough CCTV HQ, Borough Community Safety Partnership including the dedicated Anti-Social Behaviour Unit, Street Wardens, Street Services and others that would benefit from this new intelligence. These links formed the basis of the reports sent thought Community Alert could be sent.

Perhaps most importantly the project found a champion in a senior ranking police officer (Partnerships Superintendent) and enthusiasm and support from our local Sector Inspector. This connection was paramount to the project establishing integrity and obtaining subsequent funding via the Metropolitan Police, Camden Branch to develop a fully working Community Alert system for Bloomsbury.

The main objective of Community Alert was to design a method that would allow the community to report persistent nuisances or drug related activity and anti-social behaviour (ASB), and quality of life issues in their neighbourhoods to their local police / local authority. The system was developed to map these nuisances and allow the data to be processed in such as way that it can be input directly into any intelligence database, specifically to allow them importation into a full scale GIS, where it can be used for in-house analysis by either the Police or other agencies involved in community safety.

Wider aims of the Community Alert system were five fold, firstly to report and map local quality of life concerns and incidents in a logical and comprehensive manner whilst remaining anonymous, all in real-time. Secondly to organise information about neighbourhood level concerns and incidents in a searchable relational database of evidence quality. Thirdly to share information about such concerns or incidents with other interested groups working on local neighbourhood safety and quality of life initiatives. Fourthly to transmit such concerns or incidents to the appropriate enforcement authorities through an efficient, seamless, email utility (appointed authorities have access to the password protected database where they can view all mapped reports online). Finally to track the authorities' responses to individual quality of life concerns and problems as well as larger incident-type trends affecting local quality of life and allow feedback through the website.

The system was set up in 2003 for the Bloomsbury Ward in London with a second system covering Holborn and Covent Garden following in 2005. This is of particular note as it is predates the launch of both Google Maps and Google Earth. In many senses this underlines the systems innovative nature with the mapping hand traced and converted into a pan and zoom based system for maximum ease of use in pin pointing incidents.

Community Alert is in essence user-friendly, a report can be made in 4 easy steps with the aim to be a one-stop-shop to enable you to pass on information easily, without having to wade through local bureaucracy every time you wish to report a problem. Importantly, all information remains anonymous with regular users able to register for a personal username and password by contacting their co-ordinator directly. Both the Bloomsbury and Holborn and Covent Garden systems have a central co-ordinator logging in twice a day to check reports. Before we go into more detail on the background to Community Alert it is timely to walk through the steps involved in making a report to gain an overview of its functionality and user interface. Figures 2.1a through to 2.1d detail the first three pages of the Community Alert system:

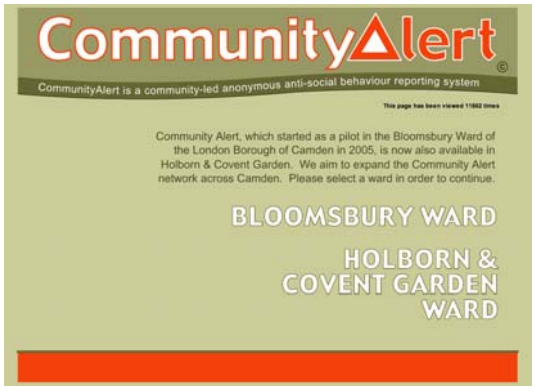


Figure 2.1a

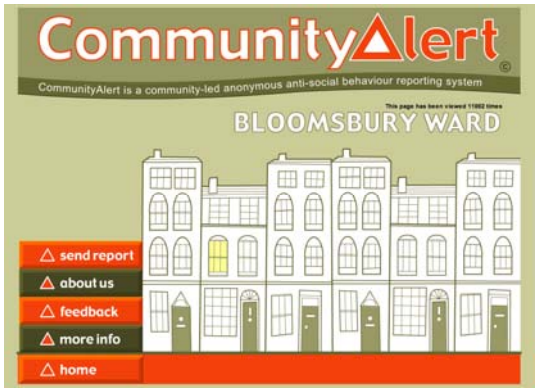


Figure 2.1b

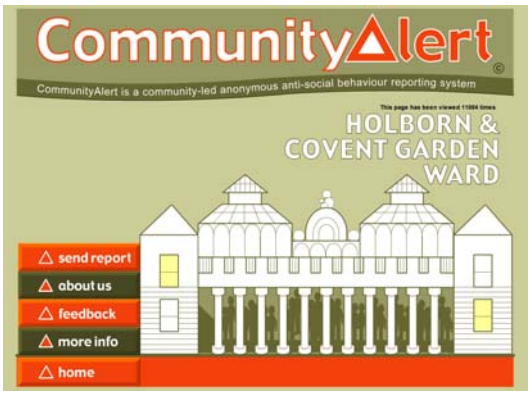


Figure 2.1c

Figure 2.1d

The home page via http://www.communityalert.org.uk/ presents the options of the two systems currently running Bloomsbury Ward and Holborn and Covent Garden Ward. Selecting the required ward loads the relevant front-page as illustrated in Figure 2.1b and 2.1c. Clicking on 'Send Report' loads a login page and an important statement for users, as follows:

The Community Alert is for reporting non-emergency instances of anti-social behaviour. This system is not linked to the police and is not manned full time. If you require urgent assistance please dial 999. If your information does not relate to an emergency situation please enter your username and password and click the proceed button in the bottom right hand corner to continue.

Figure 2.2a

Figure 2.2b

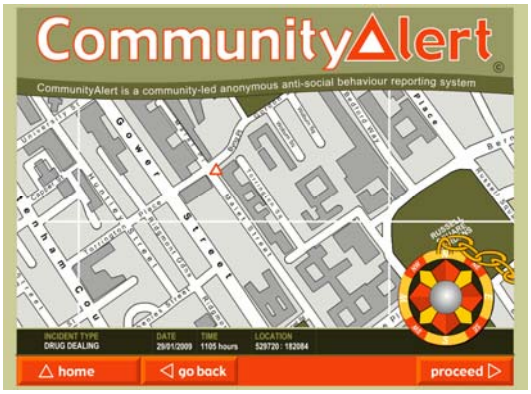


Figure 2.2c

Figure 2.2d

Users wishing to remain anonymous use the name and password provided on the opening page – 'Guest' and 'Bloomsbury' in the Bloomsbury ward example. The options to remain anonymous or register was considered central to the development, the majority of the inputs to date have been anonymous. We explore the inputs in more detail later. Once logged in the user is asked to select an incident type, Figure 2.2a, these are as follows: Abandoned Vehicles, Begging,

Cycling on the Footway, Drug Dealing, Drug Discards. Drug Use, Drunkenness, Fireworks, Graffiti, Joy Riding, Curb Crawling, Litter, Noise Nuisance, Nuisance Property, Prostitution, Sleeping Rough, Street Drinking, Threatening Behaviour, Trespass, Vandalism and Other.

Once an incident type is selected users are asked to select a date and time of the incident, via a simple calendar and clock interface, see Figure 2.2b. The third part of the system is perhaps the most central, the ability to pin point incidents on a map. The user is requested to click on the map to detail the locality of the behaviour. The entire ward is presented at street level, with the map navigable via the compass interface, as illustrated in Figure 2.2c. Of note here is the both the move into a graphics-based interface to determine location and the use of Ordnance Survey co-ordinates. Latitudes and Longitudes of all features shown on Ordnance Survey maps are determined with respect to a triangulation reference frame called OSGB36 (Ordnance Survey Great Britain 2009). By conforming with this spatial reference in Community Alert any data entered can be transferred into a professional Geographical Information System (GIS), this is deemed crucial for post incident analysis and the identification of hotspots compared to any other dataset. A prime example is the integration of data into the Metropolitan Police criminal intelligence computer system, known as Crimint.

Once the incident is located the user is asked to type in details, as per Figure 2.2d, they are taken to the final screens for sending the report and confirming the reports receipt along with a reference number. We illustrate these final steps in Figures 2.3a and 2.3b

Figure 2.3a

Figure 2.3b

Up till December 2008 the Bloomsbury Version of Community Alert has received 1600 reports, 83% concerned drug related street activity – i.e. drug dealing and using. The remainder concerned rough sleeping, begging and a few instances of threatening behaviour. Reports from the system have been used as supplementary evidence in a number of successful Anti-Social Behaviour Order cases, with the

Bloomsbury Improvement Group reporting that they believe it has contributed to a reduction in the perceived fear of crime in the neighbourhood.

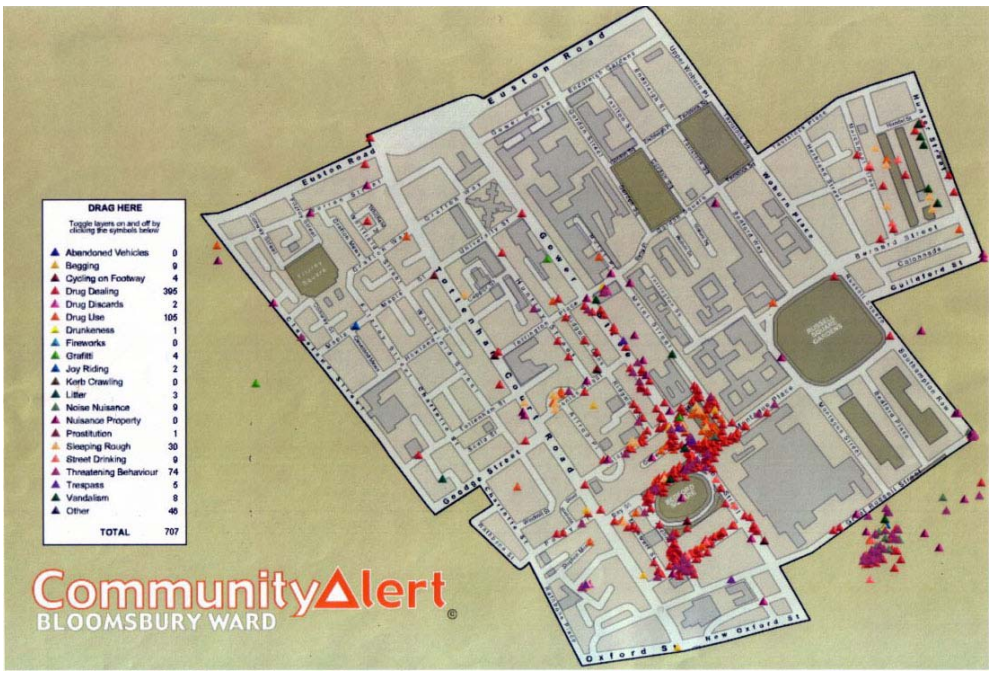


Figure 2.4

Figure 2.4 illustrates incidents reported in Bloomsbury between the August 1st 2005 and August 2nd 2006. The map is only viewable to the coordinator and relevant authorities. Automatically generated according to selected time periods the map presents an instant overview of both the level and type of anti-social behaviour in any one area. At the initial project stage it was planned to make the map viewable by all users as a way of both informing and educating the public of problems in their community. However, upon consultation with the Metropolitan Police, who funded the project, it was decided that releasing such information could have a detrimental effect on the public views on policing, as such the map, perhaps the most powerful part of the system, it not available for general consumption. Feedback to incidents according to the supplied incident number upon submitting a report was provided on the dedicated feedback page on the system. Written by the coordinator the feedback page has proved an essential part of the system ensuring that the public know of any action taking and ensuring confidence in the system.

It should be noted that when the Bloomsbury Improvement Group first tried to gain interest in the project from the Police IT Organisation (PITO) they were told in no uncertain terms that this was an area they should not explore. Reasons sited were cost (estimated in excess of £100K), and possible problems associated with the Data Protection Act, the Privacy Act and the possibility of legal problems. The total

cost for both the Bloomsbury and Holborn Covent Garden projects was £40k with the Bloomsbury Improvement Group stating that they feel the system has helped strengthen trust between community and the police and to demonstrate to the community that coordinated effort can achieve positive results. They further believe it has helped to reduce the fear of crime in the area.

We noted that when the Bloomsbury Improvement Group first tried to gain interest in the project from the Police IT Organisation (PITO) they were told in no uncertain terms that this was an area they should not explore. Cost was am irrelevant issue in our view but the local community truly believed that it has helped to reduce the fear of crime in the area. The system has evolved to integrate with initiative of 'Safer Neighbourhoods' policing strategy and become part of the community intelligence gathering process (Bloomsbury Ward has a resident population of 9300 people, 30,000 full and part time students, 70,000 workers and over 5 million visitors per annum). Throughout the project a highly pro-active response was experienced from the police, PCSO's and street wardens, police analysts, police community intelligence unit, borough council street services agencies, homeless unit, community safety agencies and CCTV control centre – the recipients.

Part Three: Community Infrastructure for Crime & Social Deprivation in a Web 2.0 World

"The public are the best weapon for fighting crime. By rolling out up-to-date, interactive crime maps we can better inform people about crime problems in their area and enable them to have much more of a say in what their local police focus on. This will help increase public confidence in the police and make communities safer." (Home Secretary Jacqui Smith 2008).

This Part introduces CASA projects from a collaborative Web 2.0 world, specifically the use of community and mapping in today's online world. Notable in Community Alert were the non-digital community methods used around a digital system. Online communities are often based around people's demographic profiles, we flock together. As such an understanding of the potential of the geodemographics for the development of online communities is an important next step.

Geodemographics are small area indicators of the social, economic and demographic conditions prevailing in small areas, or 'neighbourhoods'. They have been deployed, with success, by businesses for more than 30 years in both tactical and strategic marketing. Prior to that, the lineage to geodemographic classification can be traced to the work of the Chicago urban ecologists in the late 1920s (see Brown and Batey, 1994). However, current proprietary systems have not emerged through their inherent evolutionary superiority to all other depictions of neighbourhood differentiation(see Harris et al., 2005), and they have not engaged the communities that they purport to represent. Rather, today's geodemographics as, on the one hand, a lagged response to past impediments to effective data supply, computing and disclosure control and, on the other, disengagement by the academic community from the socio-spatial measurement task in ways that are generalised, timely, salient and safe to use.

Additionally, current geodemographic systems are not explicitly spatial in design, estimation or testing. A final strand to our critique concerns community engagement and stakeholder participation. We suggest that a more scientific understanding of the public requires improvements in the public understanding of science and anticipate attempts to foster a virtuous and self-reinforcing cycle of improvement in geodemographic classification through consultative exercises (Longley and Singleton, 2009). Taken together, the enticing prospect is of a new geodemographics that is engineered for particular applications, that recognises the provenance of data inputs, that is scientifically reproducible, that has a wide stakeholder base and that utilises the best spatial analysis methods in a problem centred approach to market segmentation.

3.1. Conception and representation of community

To many, the theoretical frameworks underpinning the current geodemographic classification of communities remain rather weak. From the perspective of the marketer, for example, Sleight (2004) acknowledges that the only central organising concept to geodemographics is that 'birds of a feather flock together'. In recent years, there has been some attempt at rapprochement between geodemographic practices with academic theory from the commercial (Webber, 2007) and academic (Burrows and Gane, 2006) perspectives, assimilating, for example, the notions of human and social capital formation in communities. In a similar vein, in drawing parallels between concepts of social stratification derived from sociological literature and labels used in the Experian Mosaic[i] typology, Webber (2007:185) suggests that these 'incorporate language which corresponds closely to that used in the discourse on both globalisation and gentrification, and studentification', although this assertion is substantiated by only limited reference to the literature, citing only a single source of Atkinson and Bridge (2005).

The shorthand labels and descriptions assigned to the different classes within any typology have without doubt been useful in promoting typologies, yet vivid description does not of itself substitute for transparency and unequivocal evidence of scientific rigour. Indeed, from the perspective of community engagement, there are few clues as to the ways in which input data are weighted, severely impairing not only reproduction but also scientific questioning of the ways in which the clusters emerged from the underlying data. This is the more worrying when the data sources are unknown to the scientific community and are of possibly dubious provenance. Additionally, the detailed methods underpinning construction of the commercial classification are closed to detailed external evaluation.

3.2. Measuring community attributes: changes in the data economy and in computation

There is no unassailable reason why this should be the case. Improvements in data availability, coupled with improvements in computer processing, are today making cluster analysis of even large and complex socioeconomic datasets straightforward and even routine – although there are residual problems of adapting some generic sources, such as the Electoral Roll, to geodemographic classification. Technological changes are now shaping the specification, estimation and testing of a new generation of bespoke geodemographic discriminators. The catalysts to these changes can be broadly described in terms of developments in the computing environment and in the emergence of new local data infrastructures. The cumulative increases in the efficiency of data creation and storage, aligned with increased processing power and bandwidth connectivity

have decentralised the capacity to create computer intensive models of urban areas away from large and expensive mainframe computers to anyone with a basic desktop computer client.

There are many interesting data sources with high temporal resolution which are or have the potential to be made available in the public domain, and that could be integrated into an area classification service, thus refreshing census based information. For example, registers of GP practices are updated in real-time as people register and de-register from these local services, and with suitable disclosure controls this information could be made publicly accessible at fine geographic resolutions (Gibin et al., 2008). Quite proper ethical considerations surrounding the use of data on human subjects need not be used to frustrate the use of data. What is required is a new relationship between the provision and supply of geographic information and the processes of urban governance, that uses the geoweb to redefine effective participation, to better contextualise web-based models, and to begin to create a cyberinfrastructure that better enables two way interaction between citizens and government.

3.3 Enabling community engagement through visualization

When scientific methodology is closed, communities have not been privy to the vagaries inherent in the specification, estimation and testing of the classification. Such situations were, however, the norm prior to the advent of what might be described as 'open geodemographics' – that is, the innovation of web-enabled classifications based upon turn of Millennium censuses. Of particular note in this regard is the UK National Statistics Output Area Classification (Vickers and Rees, 2007), which is supported by the Area Classification User Group of the Royal Statistical Society (see www.areaclassification.org.uk). This work is in the tradition of the open and free geodemographic classifications produced by the academic sector (Blake and Openshaw, 1994), with the addition of online help facilities. Such classifications fulfil the important criterion of scientific reproducibility. This property of openness can also be reinforced through appropriate public consultation exercises (Longley and Singleton, 2008), in response to concerns in the literature about public accountability and the potentially deleterious effects of negative images upon place-based marketing initiatives. Our own attempts at 'classification through consultation' have entailed amending a niche classification of engagement with new information and communications technologies in the light of extensive feedback garnered through publicising the classification through a national (BBC)online news site (see: see Longley and Singleton, 2009 and available at: http://news.bbc.co.uk/1/hi/technology/5256552.stm). This approach is also potentially of use in ascertaining the need for updating of bespoke classifications of this nature.

Such developments move beyond the realm of post facto rationalisation of general purpose classifications. Instead, they have potentially far reaching implications for the widely-recognised renaissance of interest in geodemographics from the public sector. These changes are driven in part because of government pressure to demonstrate value for money (Ashby 2005), and in part through the advent of new application areas such as community policing (Williamson et al., 2006, Ashby, 2005), health screening (Farr and Evans, 2005), analysis of educational attainment or participation (Singleton and Longley, 2008, Butler et al., 2007) and regional planning (Batey and Brown, 2007). To date, the response of a number of established geodemographic providers has been, with some exceptions, to re-badge existing consumer classifications, and to seek correspondences between geodemographic classes and different attitudes and behaviours towards public services. Correspondences are typically sought by coding up large scale public sector services according to geodemographic category and applying these at the local level to uncover public attitudes to service provision and to devise appropriate interventions.

There are several objections to this approach, beginning with the issue of whether socio-cultural similarities in the consumption of private goods and services should map onto patterns of public attitudes towards service provision. Public services which are consumed collectively and public obligations towards service providers such as the police are also often discharged collectively. Why should a particular cocktail of variables and a weighting scheme that might be suitable for predicting aggregate shopping behaviour be central to understanding local attitudes towards community policing, preventive health care or school choice? To some extent, the reason why existing geodemographic solutions are still used is because the public sector fails to unlock the value of sector data collected at the local level. The consequence is often reliance upon crude univariate measures (such as local uptake of free school meals in education applications) or, at best, multivariate measures such as the Index of Multiple Deprivation (CLG, 2007). The market is clearly ready for more sophisticated area classification methods. As such, in the next section we will present a new model for area classification that represents a unified approach to input data specification; variable estimation and weighting through the development of online web interfaces; and finally; testing, both through consultation with the public, and through the development of other modes of stakeholder involvement that move beyond the total weighted deviation assessments effectively demonstrated by Webber (2004).

3.4 A new perspective upon community geodemographics

The geodemographic model presented in this section is a vision of how neighbourhood classification might be structured and driven by the

best data, rendered accountable to community stake holders, and also used to create near real time representations of reality. Such inter-subjectivities are already acknowledged in many Internet representations: Weinberger (2007), for example describes the creation of user defined folksonomy classifications, which evolve to meet multiple informational requirements. Folksonomies may also evolve over time through the use of 'tags' to describe photographs that have been posted on websites such as Flickr (www.flickr.com). In a similar vein, geodemographic classifications could be recast as (partially or even wholly) user-generated representations of society. However, unlike the Internet folksonomies created by and for online communities, geodemographic classifications have hitherto always been created by small numbers of developers, who may be physically and socially remote from the stakeholders that use them and the people that are represented by them.

Moreover, an apparent legacy of past attitudes to cost recovery and restrictions in the availability and supply of data has been the promotion of 'one size fits all' classifications for the full range of purposes, with no right of appeal of individuals or communities against the categories to which they have been assigned. In contrast to this backdrop, our prospective vision for geodemographics embraces the practices of folksonomy, giving users access to an online service where they can create classifications which are tailored for particular purposes and which are safe to use.

There are a series of changes in technology that will enable the creation of such a service, not least developments in web browsers which enable technology such as DHTML AJAX or Flash. These open up the opportunity to create more complex user interfaces akin to existing desktop applications. Using such systems, it should be possible to build a geodemographic classification from scratch using a palette based interface, from which a range of input variables could be selected. Users would also have the ability to set weights for individual variables, perhaps through the addition of slider bars. In ways akin to graphics software, where prior to applying a specific filter on an image it is possible to preview the settings selected, it should be possible to 'preview' an area classification. Perhaps an output could be created for a small subset of the data in a small preview window, thus providing the ability to readily gauge the sensitivity of outputs to inputs in the classification building process.

A related group of technologies that are essential to the development of this service are the data sharing protocols based on XML which allow data in standard and structured formats to be incorporated into third party applications. For example, XML streams of census data could be combined with property information available from aggregation websites such as Nestoria (www.nestoria.co.uk) that provides KML files generated by search results of property for sale or

rent. This will require the support of a more integrated approach to data sharing such as the adoption of standards, and further denuding the barriers that prevent the ready dissemination of geographically referenced data. A variety of metadata relating to source, integrity, scale, temporal currency and sample size would also be required. This will be absolutely essential if the service is to be used by non experts, as this information could be used to provide a warning system about how data can be safely conflated and concatenated, or at a minimum warn as to when specialist advice is required.

The London Profiler: www.londonprofiler.org

A first step towards this goal is provided by the www.londonprofiler.org site (Figure 1) which uses CASA's GMapCreator software. It was devised as part of the ESRC NCeSS programme to create a resource on which multiple spatial data from a variety of public domain or public sector sources may be displayed. The common interface is designed to allow different stakeholders to make improved decisions using spatial and thematic search criteria. The Londonprofiler application interface is designed to be as intuitive as possible. The features of the interface are outlined in Figure 1 (see also Gibin et al 2008).

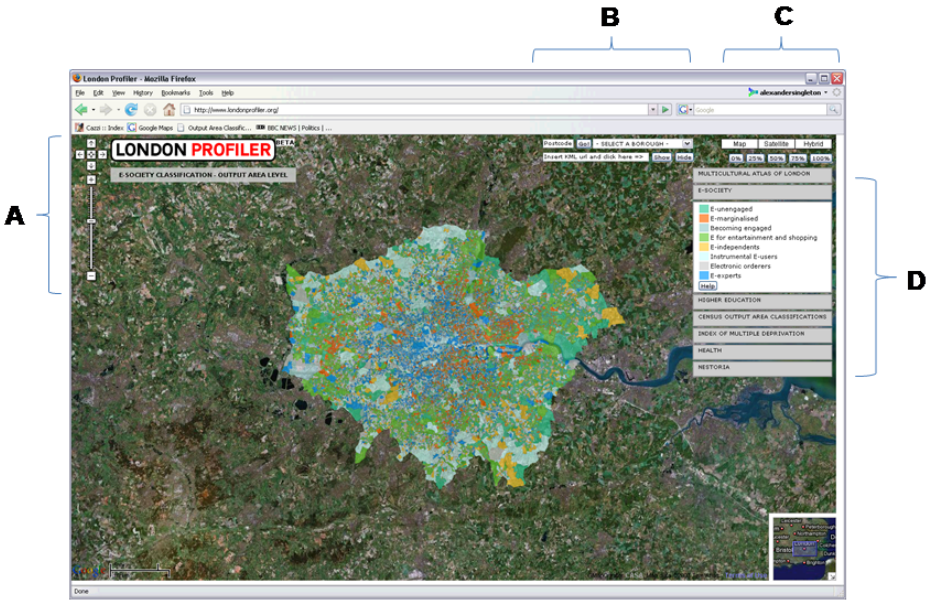


Figure 3. 1: *The Londonprofiler Interface. (Source: Google Maps / Tele Atlas).*

Key: A – The standard Google pan and zoom controls. B – Facility to select a London Borough, or search by unit postcode: each enables external KML files to be loaded on top of the map. C – Standard "Map", "Satellite" and "Hybrid" map buttons and additional map transparency controls to allow fading of thematic layer (0%, 25%, 50%, 75, 100%) over base map. D – Map attribute selection pallet.

Figure 1 illustrates the similarity between the main map interface and the standard Google Map website. Additional items have been added

to this interface in order to refine the search capability (e.g. to select by borough or unit postcode) or to add interactivity. The function of the standard "hybrid" map button (Figure 1 – C) has been altered to enable overlay of the road network data on both the thematic and satellite data.

A further feature added to the interface (Figure 1 – C) is the ability to change the visibility of the thematic data from 0% (no background data visible) to 100% (background data only visible). The colour of the thematic layer alters slightly as the transparency changes. Therefore, in order to aid visual interpretation of the data by users, the map key (Figure 1 – D) changes the colours of the labels to compensate for each change in transparency. The thematic layer can be changed by clicking on the relevant tab (Figure 1 – D, here selecting a geodemographic classification pertaining to the use of information and communications technologies). The present version of www.londonprofiler.org is static, but there are plans to render it dynamic by pasting the available datasets down the right hand side of Figure 1 available for clustering as part of a bespoke geodemographic indicator.

The Public Profiler: www.publicprofiler.org

The motivation behind 'on the fly' clustering is that, as with data, all methods should be comparatively evaluated, and that the sensitivity of method to output created should also be rendered intelligible to end users and stakeholders. Geodemographics currently borrow strength from the social similarities between scattered areas, and through clustering in attribute space they do not directly exploit locational proximity or strength of association between areas. In some sense it is therefore erroneous to purport that geodemographics are spatial classifications, and the spatial autocorrelation of geodemographic classes across space does not emerge through specification in the system. As such it is proposed that further work is needed that might make classifications more sensitive to local conditions.

Additionally, if classifications are to be created on-the-fly, then the algorithms used must be efficient enough to enable the processing of a user specification within an acceptable time period. The majority of current geodemographic classification are created using k-means. However, further research is required to examine clustering algorithms which are less resource (time and processing) inefficient. An alternative solution for handling computationally intensive processing would be to create classification runs in parallel spanning many servers and utilising some of the advances that are emerging in the field of e-social science.

Once a classification is built and evaluated, the conventional approach is for the creator of the classification to describe it, using a

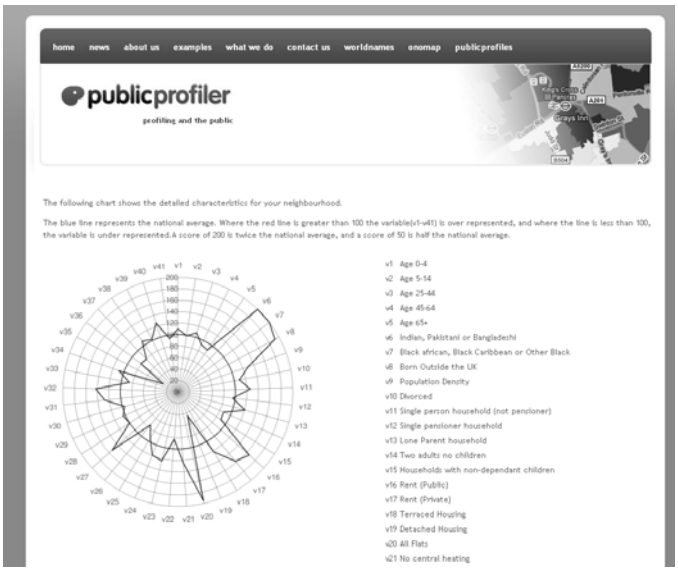
range of methods which enable users to interpret the spatial arrangement and constituents of clusters. It is proposed that through the concatenation of a classification with a range of data, the propensity for specific characteristics could be generated as simple tables and charts, perhaps using a charting API such as that demonstrated on www.publicprofiler.org (see Figure 2). Furthermore, it might be possible to semi-automate the textual description or graphic montages that are driven by the underlying characteristics of the data. As in previous public consultation activities(Longley and Singleton, 2009), public feedback on the accuracy of the cluster assignment and descriptions would also be requested.

3. 5 Future directions for community-grounded geodemographics

There has been a sea change in the way in which we conceive of the organisation of social systems. Batty (2008) challenges the view of social science that systems are in equilibrium, and argues that they should be studied from the bottom up, through methods 'that no longer takes the structures that we observe for granted but poses the much deeper question of how they develop'. This view is fundamentally at odds with the old model by which geodemographics are constructed by a small number of individuals from the top down, leading to systems that are deemed to present a 'privileged view' of reality. The development of geodemographics has been valuable in that it has encouraged focus upon the development and use of rich datasets at the local level, yet as time has gone on they have retained the perspective that the needs of real communities could be viewed through the lens of a single general purpose classification.

For a while, the illusion that this remained the best outcome was maintained because the leading commercial classifications had the best data for commercial applications (and arguably this remains the case – specifically with regard to income data but also with regard to elements of data infrastructure that the public/academic sectors should better organise). But, more generally, such a perspective is necessarily limited for the simple reason that the best classification for predicting, say, the type of holiday you will buy is not appropriate to understanding your attitudes to public health, community security or private education. This discussion has suggested that a new model of geodemographics will be dominated by a problem-centred, domain specific approach led by visualisation, interactive data exploration, and data fusion from a diverse range of sources. From an academic standpoint, geodemographics has always been data led, and this will continue to be the case. There are also implications for public sector data policy and some parts of the public sector need to lighten up about disclosure control, and this needs to be a focus of concerted research effort.

(a) Use of external APIs to visualise a typology



(b) Use of Google Charts API to graph statistics on a polar chart

Figure 3.2: *The Public Profiler geodemographic website (www.publicprofiler.org) and geodemographic descriptions*

(a) use of external APIs to visualise a typology; and (b) use of Google Charts API to graph statistics on a polar chart. (OAC is the UK National Statistics Output Area Classification; Flickr is a social networking site in which users can create shared pools of photographic images, and the Multimap site provides spatial referencing information.)

The logical extension to progress in this important domain of applied geography is that the process of creating geodemographic classifications should become more attuned to the processes of social networking, in order to facilitate classification through consultation and the involvement of communities. In this way the very process of creating classifications should serve as a means of persuasion of both the merits and validity of the exercise. This links concepts to

measurement, which lies at the heart of academic critiques of the approach.

From a GIS visualisation perspective the advent of Google Maps has raised user expectations in terms of the level of interactivity offered in Web GIS (Haklay et al., 2008). However, where cartographic representations are built to a user specification, the technical implementation of a Google Map style WebGIS is a significant challenge (Gibin et al., 2008). Using the Google API as presently configured, display of area data on the fly requires a large amount of processor usage, and as such is not suitable for websites where the re-computation of data coverages is likely to occur frequently. In order to circumnavigate these issues it is possible to use pre-rendered data, such as those created for Maptube (www.maptube.org), however leads to massive storage requirements, and would not be suitable for an application where coverages are required to be generated for each user request. However, again, like the processing of classifications from raw data, these hurdles may be overcome by deploying solutions across parallel machines with multiple processors.

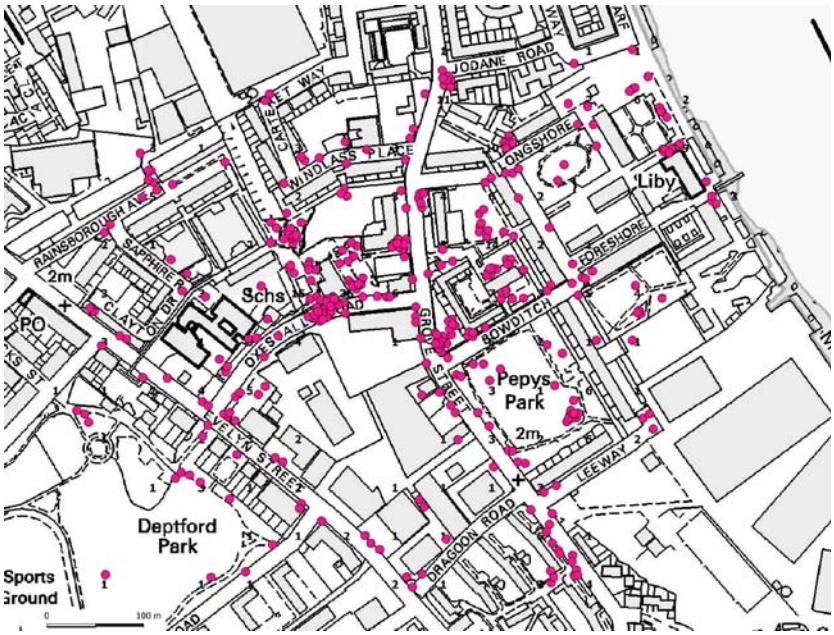
3.6 Related Infrastructure for Anti-Social Behaviour: Community Mapping and Noise

'*Citizen Science' takes off as residents tackle neighbourhood noise*
Living with too much noise can be damaging to health and make life unbearable. This year residents in two of London's noisiest neighbourhoods have tackled their problems by setting up their own noise monitoring systems.

People living in the Pepys Estate in Lewisham and in the Royal Docks area in Newham have led the way with a new way to tackle noise. The Pepys Estate currently suffers noise pollution from a scrapyard near the centre of the estate and very close to both a primary and nursery school, while Royal Docks suffers noise problems resulting from flights in and out of London City Airport (LCA), where a major expansion is threatened.

Residents in both areas have had help from a new project "Mapping Change for Sustainable Communities" run by the London 21 sustainability network and University College London under the UCL-led UrbanBuzz Programme, with help from the artist Christian Nold. London Sustainability Exchange, under the Environmental Justice programme provided the second pilot area. The project supplied local residents with noise meters and trained them in how to use these devices. They went on to make a over 1500 measurements at all times of day and night and developed their own 'noise maps'.

(a) The Royal Docks



(b) The Pepys Estate

***Figure 3.3**: Noise Monitoring and Mapping*

The results of this 'citizen science' have been remarkable. On the Pepys Estate members of the Community Forum found disturbingly high levels of noise, often continuing outside normal working hours. This noise affected quality of life up to 350 metres from the scrapyard. They have been trying to deal with this problem for over six years, initially raising concerns with the Mayor of Lewisham and others in September 2002. Since this time the disturbance has actually escalated. Now armed with this information they called a public meeting on May 15th to present their findings to the council and the Environment Agency.

Lewisham Council and the Environment Agency accept that there is a problem. After seeing the results of the survey the Agency has appointed an acoustic consultant to carry out a detailed analysis of noise in and from the scrapyard. The residents who carried out the survey will meet with the consultant to share their information, and will work with the council to agree an action plan for moving forward.

Colleen Whitaker of London 21, who led the work on the estate, said "There is no doubt that the Pepys Estate has a real noise problem. We're happy to have helped the Community Forum tackle this issue. We hope that the problem can now be resolved."

Lewis Herlitz, Director of the Pepys Community Forum says "The Noise Mapping work is a major breakthrough for residents. It allowed them to develop an evidence base about how noise damages their

quality of life. It shows that their long-standing concerns are real and need to be acted on. It provides an opportunity for greater community engagement around monitoring and speaking up for an improved environment. There is no going back."

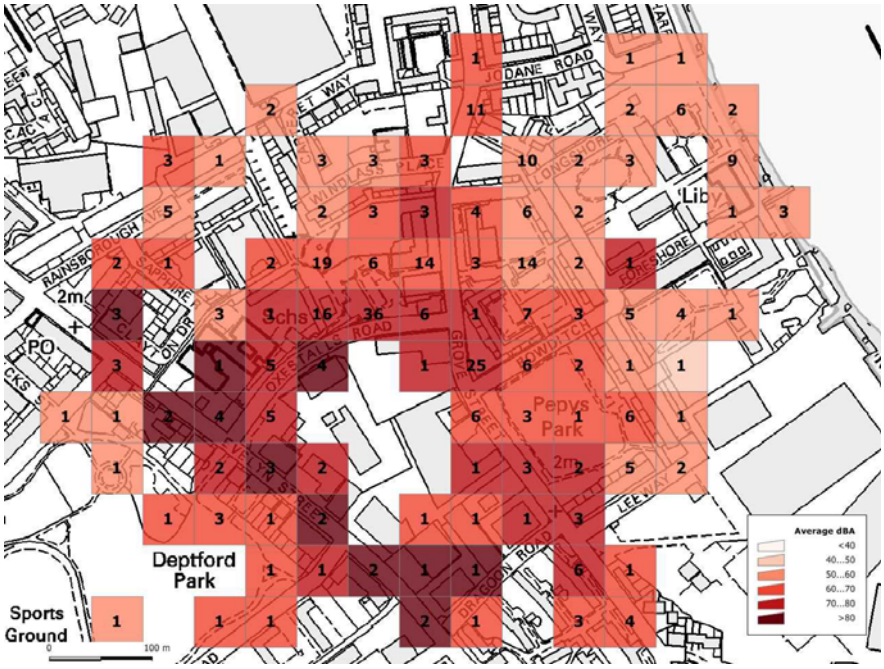


***Figure 3.4**: Community Noise Map on the Pepys Estate*

The communities surrounding LCA, including Virginia Quays and Thamesmead also found troubling results. Many readings exceed levels deemed to cause serious annoyance under the World Health Organisation community noise guidelines. The measurements gathered by the community revealed a clear correlation between unacceptable levels of noise and the LCA operational hours. More interestingly, the results obtained by both communities indicate that people are quite accurate in their perceptions of noise levels and the survey enabled them to express how these affected them. One of the residents said "the noise is irritable, I can't relax or have the window open - but I can't shut-out the noise so have to turn the TV up - but everything is then so loud."

The open meeting held on April 24th in the Royal Docks was attended by the Environment Officer for London Borough of Newham and provided a chance for local residents to find out what the local authority does in terms of monitoring noise. It was made clear that social surveys are what are missing from noise data collection and there is definitely a potential benefit of extending such surveys to a wider audience. A further meeting is to be scheduled to show the results to the planning officer involved with LCA's planning application, and other officers within the local authority.

London 21's Louise Francis who led the work in Royal Docks said "Tackling something as big as an airport can seem an overwhelming task for a group of residents. But the people who participated in this work have shown that they are willing to take on this task to ensure their health and that of their families are not put at risk for the sake of business."

Contrary to the recently published online noise maps found on the Department for Environment, Food and Rural Affairs website, which are created using computer-based models on noise samples taken from 2006/07, the results collected by both communities reflect actual ambient noise readings.

Despite an increasing body of evidence on the long-term health impacts surrounding noise exposure, it is uncertain to what extent the Local Authorities themselves understand and act on such issues, as evidenced by these examples.

Developing Noise Maps

Over seven weeks from January to February 2008 a core group of residents on the Pepys Estate, Royal Docks and surrounding areas conducted a cohesive noise pollution mapping survey. Using noise level meters supplied by UCL and a scientifically sound survey methodology (designed by UCL, London 21 and artist Christian Nold) they were trained to take noise readings at all hours of the day and night across the whole of the estate and areas surrounding the airport. In total over 1500 individual readings were taken across all the sites. The data was then analysed by UCL and London 21 using a Geographical Information System (GIS) to produce noise pollution maps for the area.

In addition to collecting noise level readings, residents also collected qualitative information expressing how they felt about the noise. They were asked to choose words such as "relaxing" "annoying" or "disturbing" to describe the sounds they heard. The results showed that the vast majority of readings were described as either *Loud*, *Very Loud* or *Extremely Loud* by residents.

In the Pepys Estate, the survey results also allowed us to identify the loudest sources of noise. As expected the scrapyard was most often identified as the loudest source of noise (even as far as 350 metres from the site itself!), but traffic (including lorries bound for the scrapyard) and airplanes were also identified as contributing to the overall noisy atmosphere on the estate. This highlights the importance of addressing noise pollution in residential/urban areas as a *cumulative* problem with potentially many sources.

A similar situation was found in the Royal Docks and surrounding areas, where the main contributor to local noise pollution was airport related. Traffic related noise was the second largest contributor. Many of the residents expressed the fact that they have become accustomed to the constant background noise generated by traffic but found the harmonics, frequency and irregularity or plane related noise, very intrusive and disturbing.

Community Actions and Building the Infrastructure

After seeing the results of the Pepys Estate mapping, the local councillor agreed to attend a public meeting along with two Lewisham Pollution Control Officers and representatives of the Environment Agency, which took place on May 15th 2008. The meeting was also attended by the regional representative for the Environment Agency. At the meeting the residents involved presented their findings to the wider community and an open question and answer session was facilitated by the Director of the Pepys Community Forum.

In Royal Docks a meeting was held on April 24th 2008 to discuss the results of the resident's survey. Following this, the Environment Officer from LB Newham has agreed to set up meetings for the information to be shown to other key people within the council.

It has recently been acknowledged that noise pollution is more than a nuisance and is increasingly becoming an important public health problem. Researchers have found that long-term exposure to noise constitutes a health risk hazard and can modify social behaviour, cause annoyance[ii], increase the risk of cardiovascular diseases[iii] and adversely affect levels of attentiveness and the ability to read in children. [iv] The current exclusive system used to calculate various noise sources does nothing to look at cumulative ambient noise (community noise; environmental noise). Continued growth in industry, transport systems and housing will generate more noise which current policy fails to be able to control at the community level.

The mapping methodology and survey design used within this project was developed as part of the Mapping Change for Sustainable Communities project, and was first implemented within the Royal Docks – one of four pilot areas involved in this project.

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Part Four: Towards a Guide for Good Practice

We are not skilled in practice although some of us are professional town planners and have some sense of what is required in the local community with respect to building an infrastructure that will support the detection and reduction of crime and disorder. In this concluding part, we will identify the key themes that we consider to be important to progressing this aim, using our knowledge of new techniques of mapping and community use so that we might guide practitioners who we define as those responsible for community building in these arts.

To summarise, there is a clear distinction between techniques that can be built locally such as our **Community Alert** system which does not require any external proprietary or non-proprietary software (other than the basic software in which it is built which is invariably low cost) and those systems that do require external resources. The problem with the latter is that although these are powerful and entirely accessible at the present time, they could be changed by their developers at any point and systems built around them are thus subject to a degree of volatility that puts their sustainability in doubt. For example, systems that rely on *Google Maps* are in this category and even though they are 'free' they can be changed at a whim by Google. Doubtless they will change through time but so far such change has been benign. Google will not last forever and in time, there may be massive changes to its business model so that community systems built around their products will always be subject to this uncertainty.

If other products are used which bypass both data and software limits such as *Open Street Map*, these too are subject to the same kind of volatility in that although there is no business model of the same kind as in case of Google, the system relies on volunteered geographic information. If the volunteers stop volunteering or if the organisers decide to underpin their activity with an explicit commercial business model, systems built around these products will fail too.

This discussion of course tends to confuse data and software. Map products such as Google rely on software built within Google and map products acquired from the commercial domain made free at the point of access by Google. In the case of Open Street Map, the map software is in the ownership of the OSM consortium while the map data which is produced by an army of volunteers is essentially in the public domain, governed by licenses akin to those that are associated with the Creative Commons. In fact, there are potential problems here for as data is captured by a volunteers using a GPS, there is always the prospect that a challenge might be mounted to the capture of this data if it is judged in some sense to be private. The current debate concerning Google Street View is a case in point.

In the case of a purpose built system such as **Community Alert**, then these rely on proprietary software which when used, generates applications that are free for any users to operate. In short, the map products and systems that are produced are not subject to any copyright other than that which the local developer wishes to insist on. Moreover such systems can be developed in house. Data is still an issue because most map data is copyrighted although there are now sufficient open sources, even from the Ordnance Survey, that these systems which predate Web 2.0 technologies tend to be robust with respect to software and data. With the appearance of open source mapping, these systems have potentially gained a new lease of life.

In short and to summarise, what is required for purpose built applications is a server and local developer with the use of data that is non copyrighted; community systems that are built in this way are likely to be quite resilient. Relying on Web 2.0 applications, there is still the need for map mashups to make the system available such as the CASA products **MapTube** and **LondonProfiler**. The guarantee of any longevity in these is always in doubt due to the fact that they are created for research applications although such systems tend to be easier to access for they do not depend as much on the availability of a particular server to enable their functioning. Again these issues are blurred and will continue to dominate any such applications.

What is also required for the development of such community infrastructure is a detailed and clear knowledge of what aspects of community crime, disorder and antisocial behaviour need to be detected and communicated. There also needs to be some sense in which there is follow up to this information. As we reported for Community Alert, although financed by the Met Police, the Police wished to be an arms length away from the product because linking this to their local crime analysts work and to formal incident reporting would raise a whole host of issues with respect to liability that confound any local and informal reporting system.

To conclude our advice, we will list a number of key issues that we consider to be essential in guiding any community in its widest sense, of a particular community group, or even local municipality in building such information infrastructure. We will list these as problem focussed issues, follow-up issues, design issues, access issues, and technical issues and these are laid out as follows:

I Defining the Problem Focus:

- Clarity about what information is required, and what is being measured
- Resolving any ambiguities about who might access the system, and where such access might take place

- Defining what data is required and how it might be displayed
- Making community problems associated with the data transparent and easy to interpret
- Preserving a degree of personal confidentiality

II Identifying Follow Up Issues:

- Deciding who should be the target for various follow ups
- Deciding how the information from the system might be communicated to those charged or empowered to follow up
- Making clear expectations concerning follow up
- Identifying different kinds of follow up ranging from action against the perpetrators of crime, disorder and ASB and actions associated with changes in procedures, the physical environment and social action.

III Design Issues:

- Development of design principles so that users can interpret the data easily
- Developing designs so that users are drawn to use the system and find it useful and available
- Decisions about enabling the user to drill down into the system and access detailed data
- Linking the system to other proprietary but open source products such as Google Street View

IV Access Issues:

- Defining who should have access
- Ensuring appropriate access from the internet, from public service locations, on hand held devices and so on; some of these issues interact with design
- Controls on access by those outside the community
- Specific links to public service authorities, the police and emergency services
- Links to longer terms data and information from crime mapping services and official data sources such as ONS

V Technical Issues:

- Questions of software design and cost
- Issue of copyright and data access
- Technical questions related to map mashups and individual profiling
- Questions related to hardware, software data and its maintenance
- Vesting ownership in the system at all levels

NOTES

[i] Mosaic is © Experian 2008. See www.business-strategies.co.uk/

[ii] Passchier-Vermeer, W. and Passchier, W.F. (2000) Noise exposure and public health, Environ Health Perspect. 2000 March; 108(Suppl 1): 123–131

[iii] Babisch, W., Beule, B., Schust, M. Kersten, M. and Ising, H. (2005) Traffic Noise and Risk of Myocardial Infarction, *Epidemiology*, **16** (1): 33-40

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