Picture of Now Research 2006: Environment

Full Research Report: Environment (3 of 3)

WP2.2 Business Modelling

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Abstract (for dissemination)	This report looks at relevant issues related to 'environment and environmental' in the areas of physical and social sciences. Particular relevance is placed on media and technology activity in these areas such as campaigns and the growth of located media.
	The study is one of the three core elements of the project 'participation, pervasive and environment'. Each section has been written to be of value on its own though many of the themes recur.
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About this report

This report looks at relevant issues related to 'environment and environmental' in the areas of physical and social sciences. Particular relevance is placed on media and technology activity in these areas such as campaigns and the growth of located media.

The study is one of the three core elements of the project 'participation, pervasive and environment'. Each section has been written to be of value on its own though many of the themes recur.

The report is organised as follows:

- **Report 1 covers mass participation**
- **Report 2 looks at pervasive computing**
- **Report 3 reviews environmental projects (this document)**

Aims of this research

Participate explores convergence in pervasive, online and broadcast media to create new kinds of mass-participatory events in which a broad cross-section of the public contributes to, as well as accesses, contextual content - on the move, in public places, at school and at home.

Participate is a three year collaborative Research and Development project, supported through the Technology Programme with grant funding from the Department of Trade and Industry (DTI) and the Engineering and Physical Sciences Research Council (EPSRC).

Our consortium blends expertise in online services, pervasive computing, broadcast media, sensors, event design and management, and education. Our partners are BT, Microsoft Research Cambridge, BBC, Blast Theory, ScienceScope, University of Nottingham and the University of Bath.

For more information on Participate please visit:

http://www.participateonline.co.uk/

For more information on the Technology Programme and EPSRC please visit:

http://www.dti.gov.uk/innovation/techprioritiesuk/about_the_programme/index.html

http://www.epsrc.ac.uk/

The three pillars of Participate are:

- **Mass participation**
- **Pervasive computing**
- **Environment**

Why should you read this document?

This report and accompanying web resources has been produced to provide a 'picture of now' of activity for 2006 in this area. It aims to inform the project and act as a starting point for anyone starting out in a similar area. It looks at issues of technology, design and content in previous work. We were particularly interested in identifying the barriers to 'going mass'.

This is not however a detailed technical document. For technical information we recommend IEEE Pervasive Computing (www.computer.org/pervasive) or (www.ubicomp.org) as international centres of excellence.

Nor is it a business review of current / future pervasive services. We expect to deliver those findings as we progress as part of one of the work packages.

This study is part of three activities around WP2 Methods & Modelling.

- **Study 1: User Research - Understanding user motivations in participation – due September 2006**

- **Study 2: 'Picture of Now 2006' - Mass participation, pervasive computing & environment (this report)**

- **Study 3: 'Foresight analysis of Participate project' – Phase 1 interviews and analysis – due October 2006.**

Participate expects to publish updates to this research periodically for the duration of the project.

Methodology

We investigated over a hundred projects and services relevant to at least one of the key aspects listed above. All involved some level of user participation and use of technology, though these couldn't necessarily be described as 'mass participation' or 'pervasive computing'. Relatively few had explicitly environmental concerns though in many cases 'locatedness'[1] was important.

Selected projects were identified by the Participate partners initially. Other projects were identified from other recommendations and by desk research of marketing material, academic work, industry analysis, commentary and speculation on various good, bad or just plain ugly websites. For those services which are run commercially, it was often difficult to access detailed information.

Many people contributed their knowledge and gave access to their projects to the creation of this report and they are listed in the credits. There is also a separate appendix document that gives a brief overview of each of the 120+ projects and services we investigated.

Some questions to ask yourself as you read this document are:

- **What are the other 'pervasive' or 'ubiquitous' technologies in 2006?**

- **What will 'mass' mean in an on demand / long tail world?**

- **What is participation in the environment?**

- **Are there other barriers we haven't mentioned?**

A small disclaimer

There is a great deal of current development in our three areas of interest and we have no doubt missed many more examples.

We make no apology for any incompleteness but encourage you to add to our public conversation on the subject at **www.participateonline.co.uk**

We hope the results are useful and stimulate more activity in these exciting areas.

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[1] Users' absolute or relative location in some way affects their experience

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Produced by BBC Research & Innovation for Participate

1   About the 'environment'

The terms 'environment' and 'environmental' have different meanings depending on the context of use. We consider two interpretations which correspond to the different meanings of environment as used in:

- **the physical sciences**

- **the social sciences**

The successful Participate DTI/EPSRC proposal envisages the following scenario:

> *"a three level structure of participation in a mass campaign: i) the public could upload large volumes of environmental information through personal devices ii) schools and communities would carry out local detailed investigations also using more specialised sensors with iii) experts providing feedback and driving a campaign through the media"*[2]

'Environment' in the above sense initially appears to do with studying the physical world by measuring things like biodiversity, air pollution, electromagnetic radiation or noise levels.

Another use of 'environment' is more common in the social sciences where people talk about 'environmental influences' and 'environmental factors'. Environment in this sense is to do with where people act and interact and how our surroundings influence us.

In both cases, location plays a role. Figure E.1 shows 'locatedness' for sample activities, i.e. the degree to which a user's specific location determines the experience.

Figure E.1 shows how important the user's specific location is to the activity:

- **High: the particular location is so integral to experience/result that relocation would not be worthwhile. Recreations of historical events on their original sites are good examples;**

- **Medium: the activity is inherently located but can be done in many or all locations;**

- **Low: there is some located aspect but it's either not explicit or not critical.**

For services such as MySpace there is no real location aspect – yet – so these are not shown.

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[2] from original Participate request for funding to the DTI and EPSRC

· Aura   · Botfighters   · Geocaching   · Ambient Wood   · Battle of Culloden

· People's War   · Moblogging   · Springwatch   · I Like Frank   · Chawton House

· Flickr   · Hitchers   · Action Network   · Savannah   · Coast Mobile

· We Feel Fine   · Dodgeball   · Yellow Arrow   · Urban Tapestries   · Queen Square Riots

<<LOW   HIGH>>
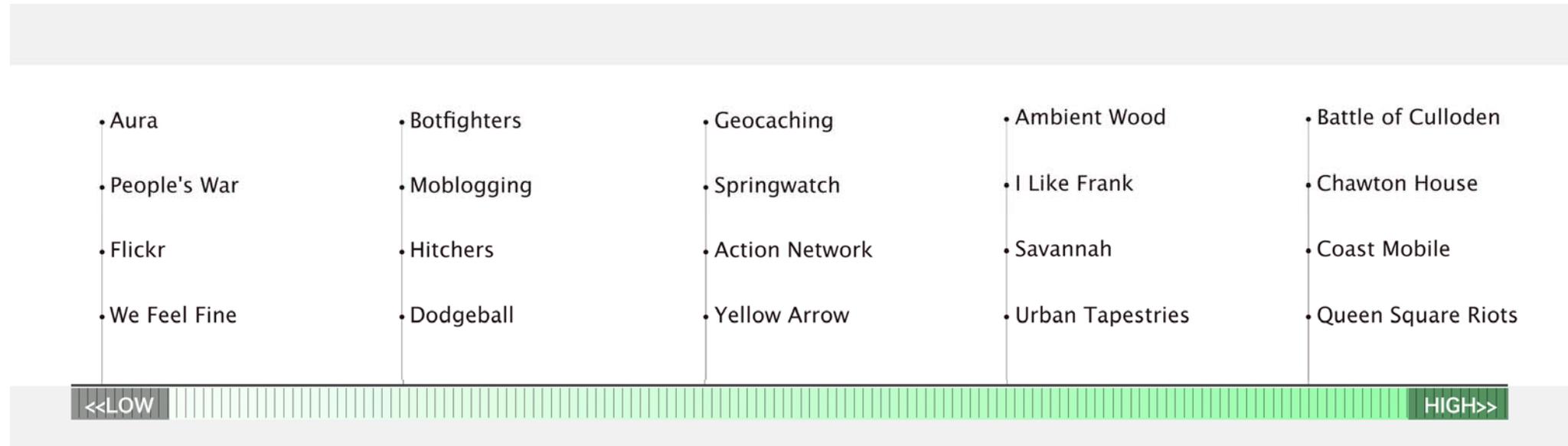
Figure E.1 Locatedness

2   Physical environment

First we discuss environment in the sense used by physical scientists. Public and media interest in 'the environment' is partly fuelled by a sense of urgency to address issues like climate change and we will look at the discussion around this issue. Usually, research in the physical sciences is done by professionals or academics but several projects have involved ordinary people working with scientists which we also discuss.

What are the environmental issues that matter most to people?

A 2001 DEFRA survey of a representative sample of the English population found the issues *currently* considered 'very worrying' were essentially local[3]:

- **Disposal of hazardous waste (66 per cent)**

- **Effects of livestock methods (including BSE) (58 per cent)**

- **Pollution in rivers (55 per cent)**

- **Pollution in bathing waters and beaches (52 per cent)**

- **Traffic exhaust fumes (52 per cent)**

- **Loss of plants and animals in the UK (49)**

Global issues were seen as less concerning though there were still high proportions of respondents who are 'very worried' about them:

- **Ozone layer depletion (49 per cent)**

- **Tropical forest destruction (48 per cent)**

- **Climate change (46 per cent)**

- **Acid rain (34 per cent)**

Interestingly, people thought that in twenty years' time many of these things would improve. Although they thought that climate change would be the second most worrying environmental issue by then, the percentage of people citing this was slightly lower at 44%. (Traffic congestion and related issues would be most worrying of all in 2021 with 52% citing this issue.)[4]

As a reality check, the same report also revealed that when asked "*What are the 2 or 3 things which you would say most affect your (you and your household`s) quality of life?*" only 11% mentioned 'Environment / Pollution' – well behind 'Money' (48%), 'Health' (34%) or 'Crime' (24%).[5]

2.1   THE environment – the original commons. And still the best?

Let's take one environmental issue: climate change. It's clearly seen as a serious issue by the general population and the experts agree. There is now an overwhelming consensus among scientists that global warming is real and that human activity contributes to it. There is much less consensus about what or how harmful its effects will be, and what we can do about it.

A recent IPPR report uses discourse analysis techniques to reveal the different "repertoires" people use to talk about climate change. Three of these are discussed below.[6]

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[3] http://www.defra.gov.uk/environment/statistics/pubatt/ch4conc.htm last accessed 14 August 2006
[4] http://www.defra.gov.uk/environment/statistics/pubatt/kf/pakf08.htm last access 14 August 2006
[5] http://www.defra.gov.uk/environment/statistics/pubatt/ch2qol.htm last accessed 14 August 2006
[6] http://www.ippr.org.uk/publicationsandreports/publication.asp?id=485 last accessed 14 August 2006

2.1.1 'Small actions'

The IPPR report identifies the optimistic small actions repertoire as one of the most dominant. This "involves asking a large number of people to do small things to counter climate change".

Campaigns and tools like newspaper columns about ethical living[7] and calculators to help us be carbon neutral[8] use the small actions repertoire.

It's clear that there are lots of opportunities for active participation in this area but there are also barriers. One barrier is that there's nothing here to get excited about. As the IPPR report puts it: "if used alone, it can be rather lacking in energy and may not feel very compelling."

Another problem is that climate change appears too intractable. It seems as if any individual's contribution will make very little difference – a concern that's amplified by the other dominant repertoire: the 'alarmist repertoire'.

2.1.2 'Alarmism'

The alarmist repertoire sees climate change as "awesome, terrible, immense and beyond human control". IPPR argues that this kind of alarmist rhetoric is damaging. It gets people to take the issue seriously, but it also induces inertia and a sense of futility about taking any action at all.

A recent essay on political website Worldchanging[9] is a good example of the alarmist repertoire. The authors describes small individual efforts as a fad saying that "green is the new black". He suggests we're being deliberately fooled into adopting these small actions by those who have vested interests "precisely because those steps are a threat to no one".

The Worldchanging author doesn't think things are completely hopeless. But he does believe that we need "a bright green revolution" to have any effect.

2.1.3 'Techno-optimism'

A third repertoire mentioned by the IPPR report is 'techno-optimism'. The Stanford emeritus professor of computer science John McCarthy is an example of a self-confessed "technological optimist".[10]

McCarthy's view (which also draws on the 'expert denial' repertoire) is that material progress is both sustainable and desirable[11], and that technology will provide the best ways of addressing problems like climate change.[12] He links to an article by the physicist Gregory Benford which suggests various 'geo-engineering' techniques that could mitigate the effects of global warming.[13]

One of McCarthy's core beliefs is that genuine urgency will be very motivating – we can and will act when we really need to do so.

It does seem that technology is developed and adopted more quickly when it serves pressing needs. Hydrogen cell technology may go mainstream in mobile phones before cars. Greater demand on mobile batteries without any new developments to increase battery life means 'water powered' mobile phones

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[7] http://observer.guardian.co.uk/magazine/story/0,,1841342,00.html last accessed 15 August 2006
[8] http://www.carboncalculator.org/ last accessed 15 August 2006
[9] http://www.worldchanging.com/archives/004343.html last accessed 14 August 2006
[10] http://www-formal.stanford.edu/jmc/progress/index.html last accessed 15 August 2006
[11] http://www-formal.stanford.edu/jmc/progress/study.html last accessed 15 August 2006
[12] http://www-formal.stanford.edu/jmc/progress/avoid.html last accessed 15 August 2006
[13] http://reason.com/9711/fe.benford.shtml last accessed 15 August 2006

could be a real possibility.[14] New technologies harnessing electron spin for power ('spintronics') could also lead to quicker and more efficient computing devices.[15]

2.1.4   We need to talk

The IPPR report comes down in favour of rebranding the small actions repertoire as "ordinary heroism" to make it more appealing and thus more likely to be widely adopted. However, individual action can only take us so far and government policies are needed on issues like building regulations, fuel taxes, emissions standards or research funding for promising technology.

The recently launched 'mass persuasion' campaign by Al Gore and the Alliance for Climate Protection tries to unite the alarmist, the small actions and, to a degree, the techno-optimism repertoires. The campaign offers a wide variety of methods to encourage action.

The various repertoires used in discussions on climate change reflect different ideologies whether anthropocentric, conservationist or deep green. There are real conflicts between values like material progress, liberty, equality or the intrinsic worth of environmental goods like forests or oceans.

In the face of this, how do we decide what policies to adopt? Some serious discussions and agreements will be needed.

Climate change is particularly relevant to young people since they will be left to deal with its effects. However, a 2002 Scottish Executive report showed that this group is particularly unlikely to participate in environmental discussions though there are many possible mechanisms for them to do so.[16]

The Scottish report also notes that citizen juries or other deliberative methods were rarely offered. These mechanisms are particularly useful "since they force young people to make much more informed opinions based on evidence, rather than simply what they think on the spur of the moment."

2.2 Citizen Science

Case study: An Inconvenient Truth

Former next president of the United States Al Gore and the Alliance for Climate Protection, have launched a high-profile 'mass persuasion' campaign on climate change that attempts to engage ordinary Americans as consumers, investors and citizens.[1] The aim is to raise awareness of global warming and increase the scale of participation in addressing the issue.

Gore's film and book 'An Inconvenient Truth' (based on a presentation he has been giving for some years) make the seriousness of the issue clear. The 'mass persuasion' campaign builds on these media.

Participation in the campaign can happen at many different levels of engagement:

- **Raising awareness by watching the film or reading the book[1]**
- **Ten tips for individuals to change their own behaviour in small ways[1]**
- **Volunteer programme to train people to give a presentation on climate change in their communities[1]**

The campaign has its detractors. Some critics suggest that all that money might be better spent by supporting existing grassroots environmental groups.[1] And there are the inevitable climate sceptics.[1]

It remains to be seen how effective the Alliance for Climate Protection's campaign will be but initial signs are promising. The film has been a commercial as well as a critical success: it's one of the highest grossing documentaries of all time according to the studio.

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[14] http://www.cellular-news.com/story/18289.php last accessed 14 August 2006
[15] http://web.mit.edu/newsoffice/2006/spintronics-0524.html last accessed 14 August 2006
[16] http://www.scotland.gov.uk/Publications/2002/09/15406/10903 last accessed 14 August 2006

Other work attempts to engage the public in scientific research. The motivations behind these projects vary. Many have real scientific objectives but other desired outcomes include: community building, encouraging young people into professional science or raising awareness of environmental issues.

2.2.1   Local science

It is probably safe to assume that most people have much more interest in the routes they walk or cycle every day than in 'pollution' in the abstract. Two projects that use this idea to make environmental issues more real to ordinary people are Urban Pollution and Feral Robots.

The Urban Pollution project was run as part of the Equator initiative. Cyclists and pedestrians in London carried carbon monoxide sensors linked to GPS receivers and logging devices. The data was mapped and visualised in interesting ways to reveal an unseen aspect of familiar places.[17]

The Social Tapestries/Natalie Jeremijenko collaboration Robotic Feral Public Authoring "enables people to feel they can learn about their environment and have the evidence to do something about it".[18] The Feral Robots work generated community participation using engaging 'mash-ups' of cheap sensors and remote-controlled toys. Participants collected readings of carbon dioxide (CO_2) and air quality by steering the robots around their neighbourhoods. The results were visualised and then explored and discussed by the participants.

2.2.2   On a larger scale

In a more celebratory vein, there's a great tradition in Britain of amateur natural historians which is alive and well:

- **The RSPB has over 1,000,000 members[19]**
- **The Woodland Trust has over 150,000 members[20]**

This interest can be harnessed in ways that are enjoyable for ordinary people and useful for the scientific community. Mass observation projects that involve studying some aspect of nature include:

- **BBC/Woodland Trust Springwatch species observations (see case study)**
- **RSPB's 'Big Bug Count'[21]**
- **Natural History Museum's 'Walking with Woodlice'[22]**
- **Cornell Lab of Ornithology's bird studies[23]**

Several of the citizen science projects have relied heavily on young people (e.g. Walking With Woodlice) and there is evidence to suggest that 'pester power' is a key driver for participation in Springwatch and the forthcoming Breathing Spaces campaign.

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[17] http://www.equator.ac.uk/index.php/articles/563 last accessed 15 August 2006
[18] http://socialtapestries.net/feralrobots/ last accessed 15 August 2006
[19] http://www.rspb.org.uk/about/ last accessed 15 September 2006
[20] http://www.woodlandtrust.org.uk/findoutmore/factsheet.htm last accessed 15 September 2006
[21] http://www.rspb.org.uk/bugcount/ last accessed 26 August 2006
[22] http://www.nhm.ac.uk/woodlice/ last accessed 26 August 2006
[23] http://www.birds.cornell.edu/LabPrograms/CitSci/index.html?lk=lpro last accessed 26 August 2006

One of the criticisms sometimes levelled at this kind of work is that "projects that bill themselves as 'participatory research' or 'action research' can be hard to distinguish from political activism".[24] However, the projects mentioned above seem to exemplify genuine collaboration between scientists and the public.

Mass participation allows research to be conducted on a scale that would be impossible using professionals alone.

2.2.3   Growing new scientists

In 2000, the "Excellence and Innovation" white paper set out the UK government's science and innovation policy for the 21st century. The paper highlighted a loss of interest in science once children start secondary school[25] and the subsequent implementation plan identified ages 11-14 as key for generating interest and increasing post-16 participation.[26]

The motivation behind the policy was mainly to keep UK plc competitive, but it also led to a sympathetic funding environment for projects like SENSE.[27]

A number of other projects focus on children at school using pervasive computing technology for environment-related activities e.g. Savannah, Mudlarking and Ambient Wood.

Case study: Springwatch

Since 2005 Springwatch has asked users to submit details of their first annual sightings of species like swifts or hawthorn. A national picture of spring emerges out of these local observations.[1]

Approximately **100,000** observations were submitted to Springwatch in total in 2006:

- **85% via website**
- **14% via postcard**
- **1% via mobile phone**

The total number of observations was down from 158,000 in 2005. This is probably because the later arrival of spring meant there was less to be observed. Overall web use actually increased by five times compared to 2005 - two thirds of this was in the period when the TV series was broadcast.

The Springwatch message boards attracted nearly **30,000** posts. Some of the comments were used on the programmes. A virtuous circle of increased contributions began when people realised they were being quoted on air by Bill Oddie.

Although the Springwatch audiences are not traditionally early adopters of digital technology, they can certainly be reached online as the figures above show.

In 2006 Springwatch observations could be submitted as SMS messages from mobile phones. The phones' locations and numbers were automatically detected and recorded along with the species code users entered. The observation and location information (though not the user's phone number) were sent on to the Woodland Trust for use in their climate change research. If users sent unusual observations (e.g. an unseasonably early sighting) they received a reply asking them to contact the Woodland Trust directly to confirm the details.

The proportion of contributors who used SMS was very small. A major factor was the complex call to action. Users had to remember both the species codes and the phone number. These could not even be promoted directly on the TV since users first needed to go online to read a large amount of disclaimer and privacy information.

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[24] http://cornell-magazine.cornell.edu/Archive/2002julaug/features/feature.html
last accessed 26 August 2006
[25] http://www.dti.gov.uk/files/file11990.pdf last accessed 26 August 2006
[26] www.dti.gov.uk/files/file14470.pdf last accessed 26 August 2006
[27] http://www.cogs.susx.ac.uk/users/hilarys/papers/cscl05.pdf last accessed 15 August 2006

There hasn't yet been time to determine whether or not the children who took part in projects like SENSE are more inclined to study sciences at higher levels. However, the children certainly found the activities engaging and the educational objectives were generally met.

One of the barriers to school trials 'going mass' is the difficulty of maintaining teachers' motivation on an ongoing basis. It's easy to do a one-off – the support of the project team and the creative possibilities provided by the equipment are an attractive combination. In the longer term, this sort of work can lose momentum. There is a barrier here, though it's not lack of equipment: many schools own Sciencescope sensors for instance, but often these are little used.

The coordinators of the SENSE project found that some level of ongoing teacher support is necessary. The GLOBE initiative[28] – a very large scale science and education programme in which up to a million children worldwide have taken part – identified the same issue. This was partly addressed in the first ten years, but a recent white paper identifies a problem caused by the overemphasis on science at the expense of educational needs. The recommendation for the next decade is to focus more on the educational aspects.[29]

> **Case study: SENSE**
>
> SENSE was a collaboration between Nottingham and Sussex Universities and schools in Nottingham and Brighton. Pupils at the two schools studied local pollution levels over the course of a school year. The children were equipped with CO sensors, PDAs and video cameras. They used the equipment to record CO levels and take videos and notes in the local areas.
>
> Back in the classroom, the children explored and analysed the data and used it to prove or disprove various scientific hypotheses, e.g. that areas with heavy traffic would have higher levels of CO. An interesting outcome was how much the contextual data (e.g. video) helped the children to understand the sampling technology. They used this understanding to make more intelligent inferences about the meaning of the raw sensor data.
>
> The children from the two schools also had shared sessions where they compared their methods and data and reflected on the different approaches they had used.

"Initially it was thought that teachers had the expertise and tools to integrate activities into their curriculum requiring little support from GLOBE. As the program matured, it was recognized that teachers needed more support, so the program began to put more emphasis on the educational needs of students and teachers in the past several years. However, the emphasis on science contributed to uncertainty about the Program's educational relevance, difficulty adapting GLOBE activities and materials to the constraints of classrooms, limited program adoption, and lower than expected teacher participation and retention rates."

Part of Participate's mission in the schools workstream will be to identify the most effective ways of maintaining and increasing participation.

2.3 Geodata, maps and visualisation

Having collected all this data how do we make sense of it? One useful way is to map and visualise it. Projects like Urban Pollution, 'Ere Be Dragons and Biomapping have developed innovative ways of visualising the data captured by participants.

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[28] http://www.globe.gov/globe_flash.html last accessed 26 August 2006
[29] http://www.globe.gov/fsl/pdf/NGG_WhitePaper_9_29.pdf last accessed 26 August 2006

Maps and visualisations can be used to communicate known results or for more exploratory purposes where researchers are trying to discover what the data means. Either way, visualising data can make the relevant phenomena seem more real e.g. by revealing the hidden. Good maps and georeferenced data are also important for location based services and located media.

Much of the high quality data in the UK is collected and held by government departments or agencies like Ordnance Survey, Hydrographic Office or Land Registry. It's often prohibitively expensive for all but the largest organisations to use it – another barrier to participation.

There has always been some criticism of this setup and there have been some moves towards making more data freely available – the 2001 census results for example – but it's not happening quickly. Recently, high profile campaigns like the Guardian's 'Free our data'[30] have been putting increasing pressure on the government to make data collected with public money freely available. Many people have embraced an open source culture and they resent it when a state monopoly shuts down this possibility.

There is a thriving open source mapping community exemplified by Open Streetmap[31] where volunteers survey areas and upload the GPS traces centrally. Some very interesting maps have been produced in this way e.g. Heath Bunting's Downhill Map of Bristol.[32] However, the gaps in area and asset coverage, and the lack of guaranteed currency in the longer term mean it would probably be unwise for an ongoing venture to rely on this sort of street map data. And for many other types of data, the government is the only game in town.

In a recent project, MySociety produced some very interesting maps showing journey times between various locations in the UK.[33] The project was funded by the Department for Transport. MySociety's acknowledgement of data sources makes the affordability issue clear:

> *"This work was funded by the Department for Transport, who also made it possible for us to use Ordnance Survey maps and data through their licence; without this assistance we would have had to pay expensive fees to use the underlying mapping data or to produce maps with no landmarks, which would be almost incomprehensible. DfT also gave us access to their National Public Transport Access Node database, which records the locations of train and tube stations and bus stops; without this it would have been difficult to produce any maps at all."*

It's not necessarily a simple decision to free our data.[34] If the collection of, say, Ordnance Survey data isn't self-funding then one risk is that the tax payer must cover more of the cost. Peter Weiss (US National Weather Service) argues that increased business tax revenues from making publicly-funded data freely available even for commercial use would more than cover any loss in direct revenue.[35]

Another risk is that since any increased tax revenue will be only indirectly attributable to the expenditure, there will be a temptation to lower the standard of the data in some way to reduce the immediate expense of collecting it.[36]

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[30] http://www.freeourdata.org.uk/ last accessed 26 August 2006
[31] http://www.openstreetmap.org/ last accessed 26 August 2006
[32] http://locate.irational.org/bristol_map/ last accessed 26 August 2006
[33] http://www.mysociety.org/2006/travel-time-maps/ last accessed 23 August 2006
[34] http://www.edparsons.com/index.php?s=ordnance%20survey%20free&paged=1
last accessed 27 August 2006
[35] http://www.primet.org/documents/weiss%20-%20borders%20in%20cyberspace.htm
last accessed 23 August 2006
[36] http://www.edparsons.com/?p=279 last accessed 27 August 2006

2.3.1   Mashups

What happens if all this data is actually freed? Will there suddenly be lots of interesting uses for it? The popularity of 'mashups' – services that incorporate data from different sources – suggests the answer is yes.[37]

The launch of Google Maps and its API in 2005 has led to an explosion of mapping activity. Google mashups range in theme from the very serious (crime[38], failed police raids[39]) to the practical (ski resorts near airports[40]) to the entertaining (Dr Who locations[41]). Mashups incorporating live data can be particularly interesting e.g. a UK example by Don Ramsey that plots data from BBC RSS feeds, among others, onto Google maps[42].

These mashups are not sophisticated cartography compared to many maps available on the web.[43] They are essentially georeferenced annotated points on a raster mapbase often resulting in what has been described as "red dot fever".[44]

Despite this, the ease of developing with the APIs means some very interesting services can be built around Google Maps and similar offerings from companies like Yahoo! and Microsoft. This includes many social software applications such as Plazes and Platial (both discussed at the 2006 Where 2.0 conference[45]).

Google et al are businesses and must be hoping to make a profit on their mapping products eventually. Google has recently launched an enterprise licence so it seems likely that the service will be developed. The established GIS industry has realised there's serious new competition and some of the major providers are also embracing the open source culture.[46] All we need now is some decent data...

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[37] http://technology.guardian.co.uk/weekly/story/0,,1699502,00.html last accessed 24 August 2006
[38] http://www.chicagocrime.org/ last accessed 24 August 2006
[39] http://www.cato.org/raidmap/ last accessed 24 August 2006
[40] http://www.j2ski.com/ski_resorts/Airports/index.html last accessed 26 August 2006
[41] http://www.doctorwholocations.org.uk/ last accessed 26 August 2006
[42] http://www.dynamite.co.uk/local/ last accessed 24 August 2006
[43] http://demo.manifold.net/Monroe/mainpage.asp last accessed 24 August 2006
[44] http://uo.space.frot.org/?node=CrossingTheLineBetweenMappingAndMapMaking
last accessed 24 August 2006
[45] http://conferences.oreillynet.com/where2006/ last accessed 24 August 2006
[46] https://www.osgeo.org/ last accessed 23 August 2006

3   Personal and social environment

In a survey of Participate project members and industry experts we asked the questions:

- **"What does the term *environment* mean for you?"**
- **"What does the term *environmental* mean for you?"**

Replies to this question mainly considered environment in the sense used in the social sciences. Most people mentioned 'location', 'place' or 'surroundings' rather than, say, 'nature' or 'ecosystems'.

This section discusses how pervasive computing has been used to explore and affect how we act and interact within our environments. We also discuss location-based services and located media. The takeoff of such services has been predicted for years but the technology to support them has not been pervasive until now.

3.1 When does 'where' matter?

It's a common complaint that the UK is becoming homogeneous and regional diversity is disappearing. This sort of view is usually based on things like the increasing similarity of the country's shopping streets where the same chains tend to predominate.[47]

But there are still many regional differences. For instance, the BBC Voices reveals great diversity of accents and vocabulary in the UK.[48] The Sparkler report also shows significant differences in the attitudes and concerns of people living in urban, suburban and rural places.

Located events still matter too. Even in the age of ubiquitous 'on demand' entertainment there are reasons to be in a particular place at a particular time: for celebrations like Glastonbury or the Notting Hill Carnival, or for competitions like football matches. The Sultan's Elephant street performance in London was a free spectacle[49] that many people set out to see and many others just happened upon to their enchantment.[50]

Physical presence also demonstrates people's strength of feeling. Up to 500,000 people in the US demonstrated earlier this year against a bill introducing stronger penalties for illegal workers. Many of the protesters were high school pupils who are too young to vote but who walked out of classes to show their support. Much of the organisation was done by the students themselves using MySpace.[51]

Participants in the Sparkler focus groups put 'being there' higher up the hierarchy of involvement than 'providing information'. The importance of events for building ties and creating shared memories was clear from the research. Online services like Meetup exist to put people in touch with others who share their interests with a view to starting real world communities.

Do all strong virtual communities have physical world spin-offs? Online communities like Flickr have spawned many new real world groups. Even the technorati meet face-to-face at events like Aula.[52] While this sort of event can seem like the usual suspects telling each other what they already know,[53] it also

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[47] http://news.bbc.co.uk/1/hi/magazine/4602953.stm last accessed 21 August 2006
[48] http://www.bbc.co.uk/voices/ last accessed 21 August 2006
[49] http://www.flickr.com/search/?q=elephant+london last accessed 21 August 2006
[50] http://www.unltd.org.uk/blogs/jamiewallace/206?PHPSESSID=622cec83450033d0d79582a9c72b24a4 last accessed 21 August 2006
[51] http://www.zephoria.org/thoughts/archives/2006/03/28/myspace_hr_4437.html last accessed 21 August 2006
[52] http://aula.org/movement/ last accessed 26 August 2006
[53] http://www.peterme.com/archives/000750.html last accessed 21 August 2006

reflects the desire of members of a genuine community to reinforce their ties by meeting up in physical space.

It's less clear if members of virtual worlds like Second Life or World of Warcraft feel the same need to meet in the real world.

3.2 Us in our surroundings

3.2.1   Studying cities

Much of the located work we found was based in urban areas. Partly this is because the logistics of running activities in cities are simpler. There's a lot of interest in how people use cities and pervasive computing can help us to understand behaviour. The Cityware[54] initiative is conducting a longitudinal study in Bath where thirty participants will use high-end mobile phones (provided by the project) for three years. Other planned activities will involve more participants for shorter periods.

BT's technical pilot Elevate used mobile technology to help local residents in Burnley understand the impact of significant redevelopments in their area. The residents could also participate actively in the consultation process by adding their own comments on the planned developments.

And understanding how people use cities can in turn help to design better computing. Both Cityware and Intel's Urban Atmospheres[55] programme are using ethnographic research methods in cities with a view to developing innovative technologies.

To 'go mass' on an ongoing basis however, located services need to cover less densely populated areas. As of 2001:[56]

- **8.5% of the population of England lives in urban areas**

- **24% lives in suburban/urban areas**

- **43% lives in suburban areas**

- **16% lives in suburban/rural areas**

- **8% lives in rural areas**

3.2.2   Studying ourselves

People love finding out about themselves. BBC online psychological tests that let people discover their brain sex[57] or how good they are at spotting fake smiles[58] can generate hundreds of thousands of responses.

We affect our environments and they affect us. At the most basic level, our environment affects our bodies and our health. We've already looked at some studies of pollution in local areas.

Christian Nold's Biomapping work lets people capture their own emotional reactions to their surroundings using wearable sensors.[59] Again part of the point is to bring people together: the neighbourhood walks happen in groups and the results are mapped and discussed collectively.

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[54] http://www.cityware.org.uk/index.php?option=com_frontpage&Itemid=1 last accessed 15 August 2006
[55] http://www.urban-atmospheres.net/ last accessed 15 August 2006
[56] http://trg1.civil.soton.ac.uk/itc/subex02_main.pdf last accessed 19 October 2006
[57] http://www.bbc.co.uk/science/humanbody/sex/index_cookie.shtml last accessed 26 August 2006
[58] http://www.bbc.co.uk/science/humanbody/mind/surveys/smiles/index.shtml
last accessed 26 August 2006
[59] http://www.biomapping.net/ last accessed 15 August 2006

Players of the 'Ere Be Dragons game had to spend half an hour maintaining a healthy heart rate. They could also choose to share their data and contribute to a collectively authored map display that was drawn in real time and could be viewed in a public space.[60]

3.3 Enhancing our surroundings

3.3.1 Located games

Location based games are one area where there's genuine innovation. The Japanese game Mogi was developed very quickly after attempts to get funding for a different game failed.[61] Despite the simplicity of the initial functionality some very interesting patterns emerged.[62]

"Basically, two very different types of playing behaviour exist:

1. *Determined collectors: they accumulate objects (sometimes ten times the same collection) and interact with other players, especially to obtain the objects they still do not have.*

2. *'Social' players who are not particularly concerned about accumulating objects. For them the main objective is to meet other players and to communicate with them. They are particularly attentive to forms of politeness that develop in communities of players and to the proprieties that onscreen encounters have to observe"*

Many urban games aim to get participants to look at their cities in new ways:

- **Navigate the Streets[63] gives teams ten cryptic clues which relate to different locations around a city. The winning team is the first to provide photographic evidence of visiting all the locations.**

- **The Go Game[64] uses actors so that players are not entirely sure who is part of the game and who is simply an ordinary member of the public.**

- **Uncle Roy All Around you players sometimes mistook real police officers and tramps for participants. Members of the technical support team on the other hand, appeared 'in character' when helping users to maintain the suspension of disbelief as far as possible.**

Most of the players' belongings were removed at the start of Uncle Roy and another Blast Theory game, I Like Frank. They were sent out around their city with just a PDA while an online player with dubious motives acted as a guide and people were directed to places they might never otherwise have visited. For some people the results were disorientating and even distressing, but the emotional engagement was undeniable.

The imminent Love City aims to connect people in Derby, Nottingham and Leicester in unexpected ways by encouraging them to send and accept "messages of love" to each other.[65]

3.3.2 Location Based Services

There is increasing industry interest in location based services. Many of these simply enhance the activities people already do: mobile social software (MoSoSo), marketing, navigation systems and

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[60] http://www.i-am-ai.net/erebedragons/intro.htm last accessed 15 August 2006
[61] http://egsh.enst.fr/licoppe/documents/Recherche/LicoppeMOgi_NidoRevisedVersion2.44doc.pdf last accessed 26 August 2006
[62] Licoppe and Inada, "Emergent Uses of a Multiplayer Locationaware Mobile Game: the Interactional Consequences of Mediated Encounters", *Mobilities* Vol. 1 (March 2006) 39–61
[63] http://www.navigatethestreets.com/ last accessed 15 August 2006
[64] http://www.thegogame.com/ last accessed 15 August 2006
[65] http://www.threecitiescreate.org.uk/Love_City/?PHPSESSID=c658f0b1e165b43b74977c65c0c2980f last accessed 15 August 2006

parking in cities. Estate agency is another area seen as having good commercial potential.[66] The Ordnance Survey site has a good overview of actual and potential location based services.[67]

These services become particularly interesting if they can sensibly use location as a relevance filter without explicit instruction by the user. Services like Loki attempt to do this – the user's current location is sensed automatically and 'channel' content delivered accordingly.

Some experiences are designed to work at the scale of a single public building. Usually, these projects aim to stimulate interactions between people who would not normally speak to one another and might not even meet. Examples include iFloor[68] (shared floor display in a public library) or Schminky[69] (communal PDA-based game played in a café).

3.4 Located media

Many of the projects were located media or 'mediascapes' where arriving in a particular place triggers events like playing a piece of audio or a video clip. Some are based in museums e.g. Equator's Chawton House guide set in the house where Jane Austen once lived.[70]

Located media demands a higher level of participation just by virtue of the fact that the user must be in a particular place to experience it fully (or at all depending on the technology used). Historical recreations of the Bristol Riots[71] or the Battle of Culloden (2004 BBC closed public trial) are much more powerful when they are set on the site of the original events.

Usually, mediascapes are sealed and users can't contribute their own content. The Webpark guide is one exception.[72] While most of the content is already there and is installed on the actual mobile device to offset potential network performance issues, users can add their own comments and observations which are propagated quickly across the network. This has the advantages of keeping the guides current and allowing park staff to verify sightings and scotch rumours.

Hewlett Packard is developing authoring systems that allow anyone to make their own mediascapes. An initial version free for use in schools launched later in 2006. The Create-A-Scape software is promoted by Futurelab.[73] HP also runs workshops at events to promote the medium more widely[74].

3.4.1 Designing for use on location

New medium:

People working in the area of located content really believe this is a new medium. Even quite dull content is often inherently more engaging when it's experienced in a particular location.

There is probably a novelty factor at work here and people will become more critical as the medium becomes more familiar. However, it's also important to plan for success. Users spent far longer than expected with Mobile Bristol's Queen's Square Riots with the result that they heard some of the items several times.

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[66] http://www.symbianone.com/content/view/3497/ last accessed 26 August 2006
[67] http://www.ordnancesurvey.co.uk/oswebsite/business/sectors/wireless/news/articles/whatarelbs.html last accessed 29 August 2006
[68] http://www.mvl.dk/Designing_for_social_use_in_public_places_Final.pdf last accessed 15 August 2006
[69] http://www.mobilebristol.co.uk/Schminky.html last accessed 15 August 2006
[70] http://www.cogs.susx.ac.uk/interact/chawton/index.htm last accessed 26 August 2006
[71] http://www.mobilebristol.co.uk/QueenSq.html last accessed 26 August 2006
[72] http://www.webparkservices.info/ last accessed 26 August 2006
[73] http://www.createascape.org.uk/ last accessed 26 August 2006
[74] http://www.banffcentre.ca/programs/program.aspx?id=532 last accessed 26 August 2006

Audio:

People with experience in the area stressed the importance of using audio. At a very basic level, audio can provide cues that everything is there e.g. a users knows a download is complete when the soundtrack starts. Users can still listen to audio content when it would distract from the experience (or even be unsafe) to look.

Audio is also very evocative as listeners to radio drama know. This can be useful for artistic or practical purposes. It's possible to talk around things easily, where much higher levels of visual realism might be needed to have the same effect. This is particularly useful when the visuals simply aren't available as was the case with BT Elevate. There were no high fidelity renderings of the planned developments in Burnley because the design process hadn't yet reached that stage.

Environmental factors:

A range of environmental factors also becomes relevant on location: traffic, rain, bright sunshine affecting screen visibility, cold making movement difficult, noise or GPS reception to name a few. Even being the wrong side of the Greenwich meridian can make it difficult to test anywhere other than the intended location.

Users may feel uncomfortable particularly in their own neighbourhoods. It's not only teenagers who resent looking uncool. The big headphones originally used by Elevate had to be replaced with a more discreet earphone because people felt too conspicuous.

New experiences:

Located content introduces distinctive experiences that were variously described as "magic moments" or "tingle factor" and which occur when the located content chimes exactly with the location for example: "when you hear a description of lovers on a bench and then you notice some in front of you, or you hear a seagull cry in the headphones and then one flies past"[75]. It's possible to increase the chances of users experiencing these magic moments e.g. by doing fieldwork to identify the characteristics of the location.

The Mobile Bristol project produced a set of user experience guidelines for developing mediascapes and these are well worth reading.[76]

3.4.2 Participatory design

Several of the projects we investigated involved users as participants in the design of the service itself. The Urban Tapestries team worked closely with people from local communities. Participants used techniques like bodystorming[77] to describe how they saw their neighbourhoods and what they wanted to say about them to others.[78]

Mudlarking – a Futurelab collaboration with two artists used the Mobile Bristol toolkit to help schoolchildren create a mediascape around the Deptford Creek area of London. The core content was co-authored by children from one school. Pupils from another school used this guide and added their own media and comments.[79]

Other examples of participatory design were:

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[75] http://www.mobilebristol.co.uk/PDF/reid05d.pdf last accessed 26 August 2006
[76] http://www.hpl.hp.com/techreports/2005/HPL-2005-181.html   last accessed 26 August 2006
[77] http://portal.acm.org/citation.cfm?id=950501 last accessed 30 August 2006
[78] http://urbantapestries.net/ last accessed 26 August 2006
[79] http://www.futurelab.org.uk/research/projects/mudlarking_mini_01.htm last accessed 26 August 2006

- **Learning from Landscapes involved researchers and teachers working with school children on improving their school grounds[80].**

- **Webpark consulted widely with users of a Swiss national park on requirements for the guide**

3.4.3   Getting people to experience located services

In general, the BBC mobile offerings are not yet widely used. This can partly be explained by the user experience issues listed in the section on pervasive computing and possibly because users don't associate the BBC with mobile content. On the other hand, the BBC received over 10,000 images captured by users on the day of the explosion at an oil depot in Hertfordshire in December 2005.[81]

The Springwatch mobile service wasn't much publicized on TV. However, the Coast mobile services were well promoted by the programmes and awareness of them was good. An interesting result from the Coast mobile experience was that of the three methods for accessing the content, the *least* used was the most accessible: simply calling a phone number from the relevant points on the walk. The WAP service was *most* used, while downloading the content to an mp3 player beforehand was somewhere in the middle. The Canadian project Murmur had the same experience – more people downloaded located stories from the website than rang the numbers posted on buildings to listen to them.[82]

This is all new and it will take a while for people to get used to new potential for their mobile devices. Museum guides are well established now but it's over twenty years since AntennaMedia launched their pioneering audio guide to Alcatraz. People clearly don't yet think of their mobile phones as potentially providing this sort of function.

How do we address unfamiliarity as a barrier to participation? Two factors for success that were suggested to us are:

> **1. Show people what to expect:** since this is a new medium people don't have any preconceptions. It's crucial to demonstrate why it's worthwhile. "The medium is so new that some user education or awareness of what to expect seems to be beneficial to the overall enjoyment of the experience."[83]

> Broadcast media has tremendous power for making people aware of something, showing how it works and making it look like fun.

> **2. Clear calls to action**: As we've seen from Springwatch, Coast and the Planet Earth bluecasting trials creating good calls to action for mobile services can be difficult so there's work to be done here. A Coast mobile producer said that clearer calls to action at the relevant locations was the one thing he would most like to do differently next time.

3.5 Safety and privacy

Widespread use of pervasive computing and location based services raise serious issues around safety and privacy.

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[80] http://www.ltl.org.uk/research/documents/FINAL%20REPORT%20FOR%20PHASE%20II%20web.pdf
last accessed 26 August 2006
[81] http://news.bbc.co.uk/1/hi/uk/5142702.stm last accessed 24 October 2006
[82] http://www.j-newvoices.org/index.php/site/story_spotlight/using_cell_phones_as_neighborhood_tour_guides/
last accessed 26 August 2006
[83] http://www.hpl.hp.com/techreports/2005/HPL-2005-181.html (pg 19)

3.5.1   The new spam

Unexpectedness is a strong theme in a lot of the activity in this area. It certainly introduces interesting possibilities for located services. People who leave their phones' Bluetooth connections on 'discoverable' most of the time are an extreme example of openness to the unexpected. Players of games like Botfighers or Mogi set up the possibility of serendipity in advance. So do mobloggers and radio listeners in different ways. Many people might enjoy the surprising (and harmless) playfulness of a Neighbourhood Cat appearing on their phones as they enter a particular mobile cell.[84]

However, very few of us want to be spammed indiscriminately as we go about our business – especially if we have the uneasy feeling the spammers know where we are… The Planet Earth bluecasting trials took place in train stations partly because these are places where people are more receptive to being given things. One possibility raised by the team was to create 'blue zones' - areas where people could safely enable Bluetooth connections. It's also possible though that people in these zones would effectively become sitting targets.

What happens when a lot of media are associated with most locations we pass through? How will we manage these so that we experience things of interest to us and avoid the rest? Will we created our own located radio stations or just turn our devices off?

3.5.2   Unwilling participation

The phrase 'drive-by data' has been used to describe the sort of data produced (as a side-effect from the user's perspective) of using a service.[85] To take Amazon as an example, data generated by users buying, searching and adding items to wishlists is fed back into the system to make recommendations for products that might be of interest. This sort of collaborative filtering is usually considered one of the hallmarks of 'web 2.0' services.[86] Users of Amazon know they're interacting with a system. The use of their data for collaborative filtering is obvious and the effects seem at least benign if not always personally interesting.

With pervasive computing and location based services, people may be much less aware that they are actually leaving data about their location and movements as they go. 'Unwitting' or even 'unwilling' doesn't often appear as a level of engagement in models of participation. The data collected about mobile phone locations (from willing volunteers) in MIT's recent Reality Mining study allowed researchers to make accurate inferences, e.g. about lifestyles and friendships.[87]

The companies behind location based services may be well intentioned and may only be using the data they gather to improve their service to us, but they will still have access to tremendous amounts of information about their users. The low proportion of us who even read the privacy and data usage policies of most websites, suggests we're not currently concerned enough about this.[88]

Adam Greenfield devotes much useful discussion to this issue in his book 'Everyware'.[89]

3.5.3   Personal safety

As new services such as people locators become more widespread, we will need to become very active in deciding who has access to our whereabouts.

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[84] http://specials.ft.com/telecoms/sep00/FT3X8EN29DC.html last accessed 26 August 2006
[85] http://paul.kedrosky.com/archives/001502.html last accessed 26 August 2006
[86] http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html last accessed 26 August 2006
[87] http://reality.media.mit.edu/ last accessed 26 August 2006
[88] http://crookedtimber.org/2006/08/19/can-you-spot-the-spam-source/ last accessed 26 August 2006
[89] Adam Greenfield (2006) "Everyware: The dawning age of ubiquitous computing", New Riders

The BBC has very strict limits on what can be done with data that locates a user and rightly so. Data captured and mapped during the initial Participate school trials clearly showed a single child's route home from school which made the team a little uneasy. Making something seem real by mapping it can raise concerns about whether it should be done at all.

The Mogi game developers realised that "perceptual asymmetries"[90] in knowledge (i.e. where an online player knows the location of a mobile player but not vice versa) could lead to abuses like stalking.

There are also more familiar but potentially serious risks like being mugged for your phone or getting knocked down in traffic while engrossed in using a location based service. These can be disturbing even if your own safety is not at risk as a Can You See Me Now online player discovered:

> *"I had a definite heart stopping moment when my concerns suddenly switched from desperately trying to escape, to desperately hoping that the runner chasing me had not been run over by a reversing truck (that's what it sounded like had happened)."*[91]

Misuse of location information and pervasive technology can even enable the kind of vigilante 'justice' seen in events from China to New York – flash mobs in their most sinister form. Not all emergence is good.

On the other hand, in a real environmental disaster pervasive technologies might help to save us as David Stephenson's "Ten 21st-century disaster preparedness tips officials won't tell you" illustrates.[92]

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[90] Licoppe and Inada, "Emergent Uses of a Multiplayer Locationaware Mobile Game: the Interactional Consequences of Mediated Encounters", *Mobilities* Vol. 1 (March 2006) 39–61
[91] http://www.blasttheory.co.uk/bt/work_cysmn.html last accessed 9 August 2006
[92] http://stephensonstrategies.com/stories/2006/08/28/1021stcenturyDisasterPrepT.html
last accessed 30 August 2006

4 Food for Thought

We've raised several environmental issues in this discussion. There's a huge amount of information available to those who want to consider these and other issues. We hope the following questions and resources will be useful as a starting point.

4.1 Physical environment

4.1.1 Aperitifs

- **How can we get sensor equipment into pupils' hands?**

- **What's the most effective way of getting people to engage with environmental issues?**

- **Will mass engagement by in monitoring and discussing environmental issues result in mass positive change in behaviour?**

4.1.2 Digestifs

- **The Savannah project final report**

- **"Warm Words: How are we telling the climate story and can we tell it better?" Gill Ereaut and Nat Segnit, IPPR**

- **An Inconvenient Truth - Al Gore's book/film**

4.2 Social environment

4.2.1 Aperitifs

- **When will there be a located media blockbuster?**

- **When located media is truly pervasive how will navigate it? And contribute to it?**

- **Will pervasive computing be "always-on panopticon … or cooperation amplifier"? 93**

4.2.2 Digestifs

- **IPerG Pervasive games report**

- **HP User Experience Guidelines**

- **Global Watch LBS in Japan**

4.3 Post-prandial exercises

- **See 'An Inconvenient Truth'**

- **Join the RSPB, Woodland Trust or other environmental charity**

- **Author a Create-A-Scape mediascape94 (if you are involved in education) OR Create a Google mashup**

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[93] Courtesy of Smartmobs – www.smartmobs.com last accessed 23 August 2006
[94] http://www.createascape.org.uk last accessed 19 October 2006

5   Credits

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Amber Rose (BBC), Andrew McParland (BBC), Anne Fairbrother (BBC), Anna McGovern(BBC), Caragh Salisbury(BBC), Dan Gluckman(BBC), Eric Freeman(BBC), Izaskun Ozerin(BBC), Janette Mooney (BBC), Jo Bellingham (BBC), Joey Julien (BBC), Kath Campbell (BBC), Luciana Baptista (BBC), Mark Jacobs (BBC), Maxine Glancy (BBC), Richard Cable (BBC), Andy Gower (BT), Craig McCail (BT), Amanda Oldroyd (BT), Jon Sutton (BT), Danae Stanton Fraser (Bath University), George Auckland (BBC), Jon Sutton (BT), Richard Harper (Microsoft), Matt Adams (Blast Theory), Benjamin Joffe (+8* | Plus Eight Star) , Christian Nold (Bio Mapping), Christian Licoppe (Télécom Paris - École Nationale Supérieure des Télécommunications), Clara Mortimer (Futurelab), Dan Sutch (Futurelab), David Mountain (City University), Ed Parsons (Ordnance Survey), Jesse Shapins (Counts Media), Jo Reid (HP Labs Bristol), Matthieu Castelli (Newt Games), Patrik Jansson (Daydream Software AB), Phil Stenton (HP Labs Bristol), Teresa Dillon (Polar Produce),Tim Shore (Navigate the Streets), Alan Chamberlain (MRL), Eiman Kanjo (MRL), Chris Greenlaugh (MRL).

ABOUT PARTICIPATE

Participate explores convergence in pervasive, online and broadcast media to create new kinds of mass-participatory events in which a broad cross-section of the public contributes to, as well as accesses, contextual content - on the move, in public places, at school and at home.

Participate is a three year collaborative Research and Development project, supported through the Technology Programme with grant funding from the Department of Trade and Industry (DTI) and the Engineering and Physical Sciences Research Council (EPSRC).

Our consortium blends expertise in online services, pervasive computing, broadcast media, sensors, event design and management, and education. Our partners are BT, Microsoft Research Cambridge, BBC, Blast Theory, ScienceScope, University of Nottingham and the University of Bath.

For more information on Participate please visit:

http://www.participateonline.co.uk/

For more information on the Technology Programme and EPSRC please visit:

http://www.dti.gov.uk/innovation/techprioritiesuk/about_the_programme/index.html

http://www.epsrc.ac.uk/