

Picture of Now Research 2006: Overview

Executive Summary of Full Research Report for Participate

WP2.2 Business Modelling

Deliverable 2.2.1

Principal Authors (BBC): K. Stynes, A. Woolard, G. Kahana

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Authors (Partner)	K. Stynes (BBC), A. Woolard (BBC), G. Kahana (BBC)		
Principal Author	K. Stynes	Email	kath@stynes.info
	Partner	BBC	Phone 020 8008 5401

Abstract (for dissemination)	<p>This report and accompanying web resources have been produced to provide a 'picture of now' of activity for 2006 in this area. The report aims to inform the members of the project and act as a starting point for anyone exploring a similar area. It looks at issues of technology, design and content in previous work. We were particularly interested in identifying barriers to 'going mass'.</p> <p>We investigated over a hundred projects and services that covered at least one of the key aspects listed above. All involved some level of user participation and use of technology, though these could not always be described as 'mass participation' or 'pervasive computing'. Relatively few had explicitly environmental concerns though in many cases 'locatedness'¹ was important.</p>
Key Words	Pervasive computing, environment, mass participation, locatedness

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

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About this report

This report is the summary of the full picture of now 2006 research report delivered to Participate as part of WP2.2 Business Modelling.

The work package objectives are as follows:

To use current market knowledge combined with findings from user trials and the Task 2.1 Service Identification outputs to develop generic business models for exploitation in the media and communications industry around pervasive and ubiquitous services.

The following activities of work are defined as:

- Activity 2.2.1 'Picture of Now' Research
- Activity 2.2.2 Business Analysis of WP1 Phase 1
- Activity 2.2.3 Revised 'Picture of Now' Research
- Activity 2.2.4 Business Analysis of WP1 Phase 2 Integrated Trial
- Activity 2.2.5 Final 'Picture of Now' Research

Activity 2.2.1 Picture of Now Research

The goal of this Activity is to pool this knowledge through partner workshop and desk research covering business / technology / market research of current landscape. This Activity will deliver a report of primary areas of interest related to pervasive and ubiquitous computing.

Activities

- Desk research / interviews into specific areas of participation, environment and pervasive computing. The key themes were identified from interview analysis from Task 2.1.1 and Plenary workshop.
- Picture of Now Research report and presentation

Written and compiled by Katharine Stynes

kath@stynes.info

Visualizations by Gil Kahana

gil.kahana@bbc.co.uk

Commissioned by Adrian Woolard

adrian.woolard@bbc.co.uk

Produced by BBC Research & Innovation for Participate

1 Introduction

1.1 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/>

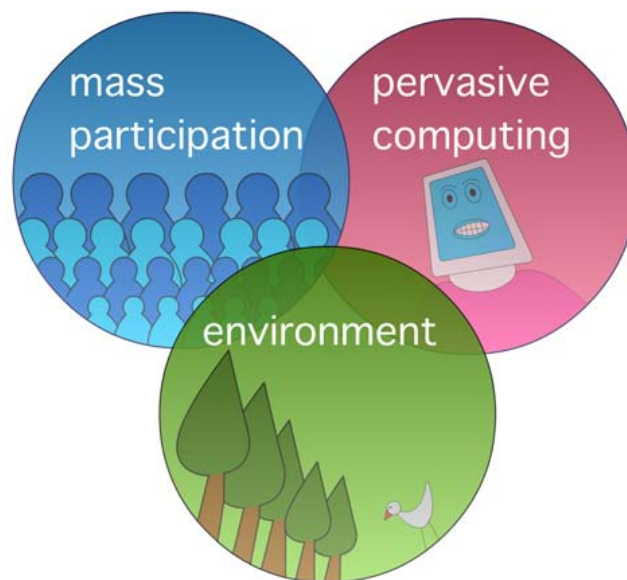


Figure 1: The three pillars of Participate: mass participation, pervasive computing and environment.

1.2 About this research

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

We investigated over a hundred projects and services that covered at least one of the key aspects listed above. All involved some level of user participation and use of technology, though these could not always be described as 'mass participation' or 'pervasive computing'. Relatively few had explicitly environmental concerns though in many cases 'locatedness'² was important.

1.3 Summary of activity

There has been considerable activity in the emerging areas of mobile and located media with engaging & stimulating examples using existing consumer technologies. However, the majority of activities that involve some / all aspects of Participate are still relatively small-scale: they have been research based, technical trials or local community-based activity whose coordinators have not sought to scale up.

Meanwhile, the popularity of what are termed 'web 2.0' services (e.g. Flickr, MySpace) are resulting in 'mass' participation. These sorts of services aren't completely new: GeoCities had over a million 'homesteaders' in 1997. However, far more people now have high-speed access and the internet is much more a part of people's ordinary lives. These services are also experimenting with new design and technical standards to support participation. Few of these services (at the time of writing) have a significant mobile component but this seems likely to change in the near future.

The report discusses each of the three pillars separately but many of the themes are relevant to more than one.

Figure 2 (next page): shows the projects and services we investigated grouped by 'genre'. While this is somewhat artificial – Flickr, for example, is both a community and a resource – it's useful as an overview.

Note: MoSoSo is an abbreviation of **Mobile Social Software**³ – a term not of our coining...

² Users' absolute or relative location in some way affects their experience

³ <http://en.wikipedia.org/wiki/MoSoSo> last accessed 28 September 2006



2 Mass participation

This section considers current thinking around the issues of participation in both real and digital form. More detail on the definitions and motivations is available in a separate study.

2.1 What is participation?

The Participate concept is based on the current role of a **'host' organisation**. Participants provide information to a 'host' to be collated and used in various ways. For instance, an anti-war march would be of interest if participants could be persuaded to upload related material e.g. stories or pictures. The issue of 'host' is a complex one that is being redefined in the web2.0 world.

Participation is not the same as emergence. People must know they're taking part and there should be some conscious intent to participate. Providing data for the sort of collaborative filtering used by Amazon (e.g. to make 'perfect partner' product recommendations) doesn't count as participation, but posting a book review, or giving feedback on a reseller does.

However, **broadcasters and their audiences may have different ideas** on what constitutes participation. Most people don't feel they are participating during activities like voting on a Big Brother eviction. However, the Big Brother production company (Endemol) and broadcaster (Channel4) would consider this to be participatory TV.

There are many motivations to participate but one of the most important is to strengthen existing social roles and ties. **Micro communities play a crucial role in generating mass participation.**

2.2 Levels of engagement

Models of participation often describe different 'levels of engagement'. The highest level (with the fewest people) is where the participants themselves set the agenda and start something new. The lowest is where people are only watching or listening.

How is a site like Flickr more participatory than some of its competitors? One reason is that it supports many levels of engagement to facilitate participation (e.g. tagging, commenting, starting groups) rather than simply being a repository for individuals to store their photos. Since there are far fewer instigators than spectators, services that concentrate purely on the highest levels of engagement limit the potential for participation.

Flickr also makes a good spectacle. Obviously the nature of the content helps, but there are many good ways to explore the content including 'interestingness' which is a measure calculated from user-generated data of various sorts.

2.3 What is mass participation good for?

What are the benefits of mass participation? What can be done that wouldn't otherwise happen? Some of the key outcomes we identified were:

- **Campaign:** Greater support increases the chances of success. *Example:* Jamie Oliver's School Dinners generated 271,677 'signatures' for an online petition;
- **Experiment:** Using public participation can provide geographic coverage and/or time that would be difficult for professionals alone to achieve. *Example:* the Springwatch survey gathered over 150,000 observations of different species for a national picture of spring;
- **Resource:** Large numbers of different contributors can produce something quickly or inexpensively. *Example:* CDDB (database of CD track listings).

Using many people's expertise, opinions and judgement makes user-generated resources different from centrally edited equivalents. *Example:* Digg (news website);

- **Entertainment:** Mass participation increases unexpectedness and this unpredictability adds interest. *Example:* World of Warcraft
Collective effort can also increase effectiveness. *Example:* solving puzzles collaboratively in Perplex City;
- **Community:** Networked participation extends and maintains existing social connections and increases the chance of making interesting new connections. It also identifies potential audiences and markets. *Example:* MySpace, Second Life
Communities form around anything that interests enough people and participation actually happens at smaller scales i.e. in micro communities. *Example:* World of Warcraft guilds.

One of the classical benefits of participation is that people tend to be **more committed** to decisions and artifacts they make themselves. This is potentially a huge benefit for addressing serious environmental issues.

2.4 In whose interest?

Although mass participation has many benefits it also has potential disadvantages:

- **Quality:** If anyone can contribute, many submissions will not be any good. Relying on viral marketing to promote the best contributions is unlikely to work for broadcasters like the BBC. New editorial skills and filter mechanisms are needed for identifying what's worthwhile. Sites like Wikipedia and Digg are rethinking their quality control mechanisms due to recent abuses so there's still work to be done.
The author of 'The amorality of web 2.0' believes that what he calls the "cult of the amateur" means we are failing to recognise, value and cultivate genuine expertise.⁴ Are we in danger of settling for the second-rate?
- **Ownership:** The Gracenote music database (as used by iTunes) started as a user-generated resource called CDDB. These people probably thought their contributions would remain freely available but CDDB was sold off and from March 2001 was only available under licence. Will its original contributors be more sceptical in future?
- **Privacy and permanence:** Members of MySpace and other social networking sites may feel as if they're having private conversations with friends rather than making public statements about themselves. Prospective employers may feel differently. Our online trails may be something we need to worry about in the same way as our credit histories. How permanent are the effects of our contributions? How much do we trust the hosts?
- **Creative futures:** 'Crowdsourcing' may also be a way of undercutting professionals. The rise of user-generated resources will mean big changes for creative industries. Whether these are overall losses or opportunities remains to be seen.

⁴http://www.rougtype.com/archives/2005/10/the_amorality_o.php last accessed 1 September 2006

3 Pervasive computing

As its title suggests, this document is intended to reflect current use of pervasive technologies rather than to imagine futuristic scenarios. We've concentrated almost exclusively on issues around the end-user devices though clearly there are many back-end system issues relevant to developing ubiquitous services. For example, how do we determine likely user context based on the device and location someone uses to interact?

3.1 Components

The terms 'pervasive' and 'ubiquitous' are often used interchangeably. However, there does seem to be a difference that makes the following distinction appropriate⁵:

- Internet: access to the internet is ubiquitous
- Mobile: mobile devices are pervasive

We have focused on **mobile devices** because they seem most relevant to the pervasive and environment (located) aspects of Participate. Mobile is also the problem 'component' for ubiquitous services. Until recently, separate devices have been used for different functions though there is increasing use of mobile phones e.g. as mp3 players and cameras. However, there are few standards for mobile phone applications other than voice and SMS.

Mobile bandwidth has increased with the new 3G **networks** and mobile operators are keen to attract consumers to use it. Mobile internet use, though still low, is rising. In separate developments, wi-fi is also becoming more ubiquitous. The number of hotspots in UK grew by nearly 100% in 12 months up to June 2006 and new areas of continuous coverage are appearing. The number of wi-fi enabled mobile phones and other devices is also increasing.

Broadcast media appears to be ubiquitous in its access and must be considered as part of the mix for future ubiquitous services. However, the distinctions between broadcast and online media are starting to blur. Organisations like the BBC are beginning to broadcast live over the web (via multicasting and streaming) and the BBC's new iPlayer will make programmes available for download online for a limited period (7 days in first instant) after the initial broadcast.

Meanwhile, TV itself is becoming more 'on demand': Sky+ has increased subscriptions by 46% in the twelve months to Q1 2006. The Slingbox allows people to programme their media devices and access content on them over the internet while they're away from home.

Will there still be a role for broadcast in an 'on demand' age? The communal and live aspects of broadcast may still be distinctive features. For example, 17% of the world's population (1.2 billion people) is estimated to have watched the 2006 World Cup final.

3.2 Level of technology

The projects investigated differ greatly in the kind of technology used, from well-established technologies like websites to specialised tools such as sensors, PDAs used for live action and wearable devices.

There seems to be a move away from higher levels of technology towards using more established tools which will make scaling up or repeating activities easier. For example, Participate partner Blast Theory's new game 'Day of the Figurines' relies mainly on SMS interactions and Nottingham's EQUIP2 game/ server (rather than live sessions using handheld computers which required significant planning and support).

⁵ <http://www.futurelab.org.uk/viewpoint/art71.htm> last accessed 25 September 2006

In general, where location has been a major factor, the technology is accessible to fewer people. However, some positioning technologies appear to be gaining critical mass in the UK. Methods that seem particularly promising are:

- **GPS:** use in car navigation systems is becoming common and is likely to become more widely available in phones (as is the case in Japan and increasingly in the US). The Ordnance Survey has remapped its assets to latitude/longitude for compatibility with GPS;
- **Cell-ID:** most mobile carriers have 'location-enabled' their networks allowing a user's location to be automatically passed on with other data. This was trialled by the BBC to automatically capture the location of Springwatch observations sent by mobile phone;
- **2D datacodes:** users capture these with a cameraphone, decode the URL and download information relevant to the associated object or location to their mobiles;
- **Wi-fi triangulation:** increasingly effective as wi-fi coverage becomes ubiquitous.

3.3 Barriers

Many of the main barriers around mass uptake of new mobile services stem from lack of standards:

- **Setting up mobile connectivity:** The first barrier is possibly the hardest to overcome. Just initialising GPRS, Bluetooth or Java can be a complex task. Different devices work in different ways, so that giving instructions is difficult in many contexts where it would be useful;
- **Cost to end user:** Unknown or unclear pricing is a problem, particularly when a service is used on an ongoing basis. Unlimited data plans such as T-Mobile's new Web'n'Walk might help if they become popular;
- **Development costs:** The lack of standards causes real problems for developers – several versions of software are needed to support a reasonable base of devices. If mobile web browsers take off, this may be less of an issue; Mobile licensing can also be a problem. For example, music rights are negotiated separately for mobile which adds extra costs;
- **User experience and user appeal:** Mobile devices have user experience issues that have been overcome in the desktop environment: small screens, clunky menu systems and lack of access to reliable search engines. More fundamentally, mobile is a different medium, e.g. people watch or listen to smaller chunks of content on mobile devices. We can't just transplant existing online services. However, O2's mobile community Mywap and 3's SeeMeTV seem to be getting it right.

3.4 The future is bright...

Convergence on what? There seems to be a trend towards mobile phones replacing standalone devices like mp3 players and digital cameras and sales of 'smart phones' were up 55% in Q1 2006 from the previous year. On the other hand, there is also a trend towards 'back to basics' phones, evidence that some people are using multiple handsets and a buoyant market for new mobile games consoles. Nor is it clear how much of a threat wi-fi is to the mobile carriers, though Telco's like BT are hedging their bets.

This uncertainty presents real issues for the Participate project and other similar projects / services. If we want to 'go mass' we need to keep the technical bar low and aim for devices people already own. There are many interesting possibilities using the kit that people have. However, the potential is greater for emerging tools and things are changing quickly. So, a key decision for Participate will be whether to:

- Use well-established tools.

- Hope that some technical front runners will become apparent in the near future.
- Layer the experience so that people with lower tech devices can still participate but owners of the latest kit can do more interesting things.

Ubiquitous services: As Mogi analyst Ben Joffe noted, “Ubiquity does not necessarily mean the same service on all devices”⁶ Overall, there is a need for standards and skills to provide appropriate levels of access to the same services using different devices. This will be for technical reasons (such as display or bandwidth) and because the device being used will represent different user needs and contexts. Again, development costs will be a barrier here.

Ultimately, what will be the distinctive properties of different devices and media?

⁶ http://www.akebonobashi.net/Ubicomp2005_Mogi.ppt#35 last accessed 29 August 2006

4 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.

4.1 Physical environment

'Environment,' in the sense originally proposed by Participate, considers studying the physical world by measuring phenomena like biodiversity, air pollution, electromagnetic radiation and noise levels.

The following issues need to be considered:

- **Alarmism and small actions:** Public and media interest in 'the environment' is partly fuelled by a sense of urgency in addressing issues like global warming. A recent IPPR report identifies different "repertoires" people use to talk about climate change.⁷ The 'mass persuasion' campaign recently launched by Al Gore and the Alliance for Climate Protection tries to reconcile different 'repertoires' by providing multiple levels of engagement to raise awareness of climate change and encourage action;
- **Citizen science:** Another approach to mass environmental participation is to engage ordinary people in science. Mass observation projects that involve non-scientists studying some aspect of nature include Springwatch and the Cornell Lab of Ornithology's bird studies. 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".⁸ However, these projects seem to exemplify genuine collaboration between scientists and the public;
- **Geodata, maps and visualisation:** Having collected all this data, how do we make sense of it? Maps and visualisations can be used to communicate known results or for more exploratory purposes. Good quality maps and geo-referenced 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. It is often prohibitively expensive for all but the largest organisations to use it – another barrier to participation. There is increasing pressure to 'free our data' from people who are used to an open source culture. The popularity of 'mashups' based on services such as Google Maps suggests there would be interesting uses of this data if it were more accessible.

4.2 Social and personal environment

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 how people act and interact and how our surroundings influence us.

Much of the located work we found was based in urban areas. There is a great deal of interest in how people use cities and pervasive computing can help us to understand this: understanding how people use cities can in turn help to design better technology.

⁷ Repertoires the report identifies include: 'alarmism' (serious but hopeless); 'small actions' (worthy but dull and possibly ineffectual) and 'techno-optimism' (science will fix everything as soon as it's urgent enough)

⁸ <http://cornell-magazine.cornell.edu/Archive/2002julaug/features/feature.html>
last accessed 26 August 2006

There is increasing industry focus on location based services. Many of these simply enhance the activities people already do, e.g. mobile social software or navigation systems. These services become particularly interesting if they can sensibly use location as a relevance filter without explicit instruction by the user.

Pervasive technologies can allow people to gauge the impact of redevelopment in their area, to look at their cities in new ways or to explore their own physical and emotional reactions to their surroundings. It can also be used to stimulate interactions between people who would not otherwise meet.

4.3 Located media

Many of the projects we looked at were 'mediascapes': located stories or guided tours where arriving in a particular place triggers events such as playing a piece of audio or a video clip. Examples include the BBC's multimedia recreation of the Battle of Culloden or Mobile Bristol's Queen's Square Riots 'radio play' – both authored to be experienced on the sites of the historical events. People working in this area believe this is a new medium with its own opportunities and challenges. Even quite dull content is found to be inherently more engaging when it is experienced in a relevant location. Hewlett Packard is developing authoring systems that will allow anyone to create their own mediascapes.

Some of the distinctive issues around located media are:

- **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. Users may feel conspicuous or uncomfortable, particularly in their own neighbourhoods. Located participatory design methods such as bodystorming become important to address these issues;
- **Audio:** Those with experience in the area stressed the importance of using audio which is highly evocative, less distracting from the physical surroundings and important for providing cues, e.g. that a download is complete;
- **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. It's possible to design to increase the chances of users experiencing these magic moments;
- **Unfamiliar:** Located media required people to use mobile devices in unfamiliar ways which is a barrier to participation. The BBC has not yet cracked calls to action for located services, though showing people what to expect beforehand certainly helps.

4.4 Safety and privacy

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

- **Serendipity v spam:** Unexpectedness is a strong theme in a lot of the activity in this area. It certainly introduces interesting possibilities for located services. 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... What happens when there is a lot of media associated with most locations we pass through? Will we create our own local radio stations or just switch the connections off?
- **Unwitting or unwilling participation:** With pervasive computing and location based services, people may not be aware that they are leaving data about their location and movements as they go. 'Unwitting' or even 'unwilling' does not 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 about lifestyles and relationships.

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 still have access to tremendous amounts of information about their users. Do we trust them?

- **Personal safety:** As new services such as people tracking become more widespread, we will need to be active in deciding who has access to our whereabouts. 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.

There are also mundane but potentially serious risks like being mugged for your phone or getting knocked down in traffic while engrossed in using a location based service.

5 Where next?

If the issues raised in this document are of interest, you may wish to explore some of the other Participate resources and activities.

5.1 Picture of now

This summary provides a brief overview of the area and some of the key issues relevant to the Participate initiative. The following documents expand on these:

- The **full report** contains more detail on all of these and includes references to many of the resources we consulted;
- The **appendices** give more information on the projects and services we investigated, and a listing of the people who contributed to the report;

Both of these documents can be downloaded from the Participate website:

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

Many of the resources we referenced are freely available online and many of these are well worth visiting. We have created a set of **del.icio.us bookmarks** linking to these at:

[http://del.icio.us/BBC at Participate](http://del.icio.us/BBC_at_Participate)

Next update... We expect to be updating the 'Picture of Now' in July 2007.

5.2 The nature of participation

Research agency Sparkler carried out a qualitative study in 2006, on behalf of Participate, into how and why people take part. "User Research - Understanding user motivations in participation" is publicly available from Participate website at: <http://www.participateonline.co.uk/>

5.3 Other Participate activities

The practical workstreams of the initiative involve:

- **Trials:** evaluating these technologies and their potential applications. Initially this will be done in three strands focusing on: schools, games and communities.
- **Technology:** developing new combinations of devices (including mobile phones and sensors) and platforms to support participation;

Alternatively, contact the project leads for more information:

Adrian Woolard (BBC)	adrian.woolard@bbc.co.uk
Amanda Oldroyd (BT)	amanda.oldroyd@bt.com
Andy Gower (BT)	andrew.p.gower@bt.com
David Crellin (ScienceScope)	david@auc.co.uk
Dawn Woodgate (Bath University)	d.woodgate@bath.ac.uk
Matt Adams (Blast Theory)	matt@blasttheory.co.uk
Richard Harper (Microsoft Research)	r.harper@microsoft.com
Steve Benford (Nottingham University, Mixed Reality Lab)	sdb@cs.nott.ac.uk

ABOUT PARTICIPATE

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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/>

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