

Participate: Producing A Mass Scale Environmental Campaign for Pervasive Technology

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The Participate² project is exploring how pervasive computing can support future mass scale environmental campaigns in which the public upload and access information about their local environments and engage in reflection, discussion and debate. We introduce the idea of 'three layer participation' in which members of the public collaborate with broadcasters, networks of schools and other organisations as part of a multi-faceted campaign. In the first phase of the project, we have conducted three exploratory trials focusing on schools, visitors to Kew Gardens in London, and members of the public playing a pervasive game on mobile phones. Based on our experiences in these trials we outline the research challenges to be addressed in the second part of the project and that define an agenda for supporting future participatory campaigns.

1. Introduction

At the turn of the 21st century we have become engaged in a global debate concerning the nature and impact of climate change and our role as individuals, societies and indeed a global community in managing our environment. In order to pursue this debate we must address three key challenges. We need to *gather information* about the environment on a greater scale than ever before, we need to *inform the debate* by conveying environmental knowledge in new ways, and ultimately, we will also need to *persuade people* to change their behaviours.

We believe that pervasive computing can ultimately engage millions of people in mass participation environmental campaigns, raising awareness of environmental issues, supporting education, activism and democracy, and delivering environmental data on a scale never before possible.

¹ and Amanda Oldroyd (BT), Andy Gower (BT), Adrian Woolard (BBC), Nick Tandavanitj (Blast Theory), Steve Benford (University of Nottingham), Danae Stanton Fraser (University of Bath), David Crellin (Sciencscope), Richard Harper (Microsoft Research Cambridge)

² See www.participate-online.org for information about the project including recent papers

2. The Participate Project

Participate is a UK project to explore the potential of pervasive computing to support mass participation environmental campaigns. The project brings together a consortium of industry and academic partners to collectively explore how the convergence of mobile, online and broadcast media can enable a broad cross-section of the public to contribute to, as well as access, environmental information – on the move, in public places, at school and at home. The partners and their respective interests are: BT (telecommunications), The BBC (broadcasting), Microsoft Research (computing), ScienceScope (sensors and dataloggers), Blast Theory (artists), The Mixed Reality Laboratory at the University of Nottingham (pervasive computing) and the School of Psychology at the University of Bath (learning technologies).

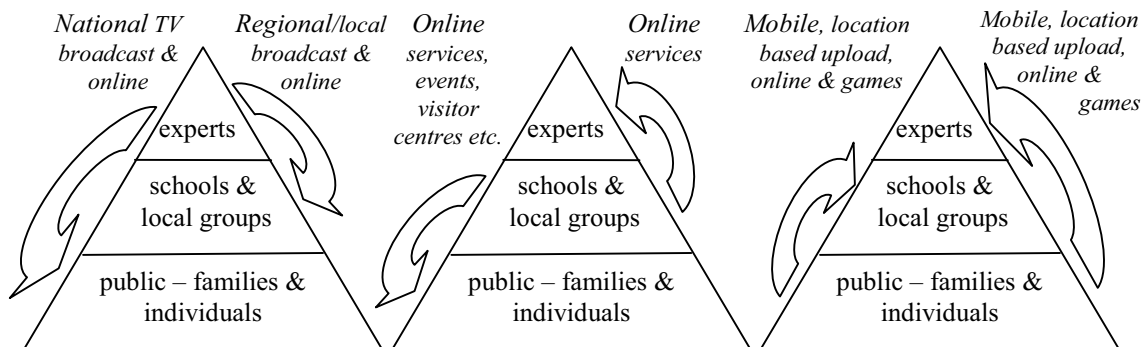


Figure 1: Three layers of Participation

Inspired by a history of television led ‘big science’ projects in the UK, such as the BBC’s annual Springwatch campaign [1], Participate is exploring a generalised ‘three layer’ approach to participation as shown in figure 1.

- **The public** – individuals and families – establish a general background picture of ‘quality of life’ factors across the country.
- **Schools and local-groups** carry out focused investigations of particular localities, drilling down into the background data in more detail using more specialised sensors and dataloggers.
- **Experts** working with broadcasters drive and shape the overall campaign, assimilating information and feeding it back.

Participate began in January 2006, and at the time of writing (January 2008) has just reached the beginning of its final year. The initial eighteen months of the project involved designing, deploying and studying three focused trial experiences to test initial ideas and technologies; the schools trial, the community trial and the public trial. The schools trial brought together different schools in a series of multi-study technology-supported science activities. The community trial involved visitors to Kew Gardens engaging with interactive posters and large displays and making and sharing their own video documentaries. The public trial involved creating a context-aware game for mobile phones called *Prof.*

Tanda's Guess A Ware that attempted to build a picture of the player's environmental behaviour over a period of several weeks, inviting them to reflect on or even change their daily routines. The trials explored different contexts and approaches to participation across our different layers, and their results are now being fed into the design and development of a final integrated large-scale public campaign that will take place across the UK in the Summer of 2008.

3. A Research Agenda for Mass Participation Campaigns

Our initial experiences in the schools, community and public trials have informed an emerging research agenda for the second half of Participate and we hope for future research into mass participation campaigns in general. This agenda includes the following research issues.

Reflection, feedback and personalisation: The next major challenge is to encourage participants to reflect on the data gathered and on their own environmental behaviour. How can environmental information best be summarised and presented back to participants in different contexts? How can participants understand their own information within an aggregated whole? How can we portray historical information? And what are the roles of broadcast and online channels in this?

The role of pervasive play in persuasion: Do such games such as 'Prof Tanda' have a special role to play in actively shaping behaviour? Can they engage new audiences who may not respond to traditional challenges? How and when can we best interrupt people? What level of contextual knowledge is required if such games are to be effective?

Digital rights and digital footprints: Our experience in the schools trial shows that the reuse and publication of gathered information can be a complex and tricky issue, especially with regards to the recorded movements of children. How do rights issues affect people's motivation to participate? Is there an appropriate framework for negotiating the reuse of information, both in original and aggregated forms, that can be understood by individuals and yet is flexible enough to serve the needs of multiple regulatory needs, including those of schools and broadcasters? What are appropriate technical points of control within a system, specifically are peer-to-peer or centralised approaches more appropriate?

Human-sensor dialogue: The nature of interaction between humans and sensing systems is an ongoing topic of research within HCI (for example [2]). Participate raises new questions here, especially concerning the integration of mobile and fixed sensors. Building on the schools trial, how can we extend mobile sensors to compare individuals' experiences of and interactions with an environment? Conversely, how can sensors that are fixed in the environment engage passers by, providing them with location specific information or encourage them to annotate sensors readings with qualitative information such as images of the local context?

Technologies, channels, preferences and modes of participation: Given that there are various technological means of participating in an environmental campaign, what is the relationship between technology type and participant type?

4. Conclusion

In conclusion, we believe that pervasive computing has a key role to play in helping inform environmental debate and supporting people in reflecting on and even changing their behaviours. Participate has brought together a unique consortium of industrial and academic partners to explore this topic, developing new approaches and technologies and also defining the research agenda for future mass scale environmental campaigns. This paper has articulated some key research challenges that have emerged from our initial forays into this territory. The second phase of the project will involve exploring these within the context of a final integrated large-scale trial.

5. Acknowledgements

We gratefully acknowledge the support of the UK's Engineering and Physical Sciences Research Council (EPSRC) and Technology Strategy Board for funding this work. We would also like to thank the many researchers who have contributed to Participate and also our external partners Kew Gardens and all the schools, teachers and pupils who have taken part in this research.

6. About the Authors

Mark Paxton is a researcher and PhD student at the Mixed Reality Lab at the University of Nottingham. His background is in Electronic and Computer Engineering, and research interests explore human-sensor dialogue. His involvement with the Participate project relates primarily around the use of environmental sensors and datalogging equipment in educational contexts, and his previous work has investigated educational use of mobile phones in schools and e-science techniques for the study of the environment in schools.

7. Workshop Aims

We would like to share our experiences from the three trials in the initial stage of Participate with fellow researchers in environmentally engaged areas of pervasive and persuasive computing, participatory sensing and HCI. We would welcome the opportunity discuss the Participate project and our ongoing work with other workshop participants. We would also like to pursue opportunities to expose the platforms and methods we have developed to a wider audience with a view to possible future collaborations.

8. References

- [1] BBC Springwatch, <http://www.bbc.co.uk/nature/animals/springwatch/index.shtml>
- [2] BELLOTTI, V., BACK, M., EDWARDS, W. K., GRINTER, R. E., HENDERSON, A. AND LOPES, C, Making Sense of Sensing Systems: Five Questions for Designers and Researchers, Proc. CHI 2002, CHI Letters, 1 (1), 415-422, Minneapolis, USA, 20-25 April, 2002, ACM.