

# Talking Robots: Examining Public Engagement with emerging robotic technologies

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## Introduction

Robotics, genetic engineering and nanotechnology have been identified as the three most powerful emerging 21st century technologies (Roco and Bainbridge, 2002). Although nanotechnology and new genetics have received varying levels of attention regarding public views, attitudes towards robotic developments have remained relatively under-explored. Encouraging publics to engage in a dialogic process has recently become a central component of science in society policy and in recommendations given to science communicators (HMT/DfES/DTI, 2004). This project offers a timely opportunity to compare engagement exercises in a promising and complex area of science and technological development: robotics.



*'Whenever anyone says...oh we must do something for the public, everybody immediately says, oh yes, robots!'*

*'People like robots. The robot people should do something.' (Engager, Science Museum/Centre)*

## Background

Public attitudes to developments in science and technology have an extensive research history. Many studies have impinged on robotics research – the Eurobarometer series, for example, has asked questions regarding information technology and factory or fixed automation. Robotics research has gathered momentum in recent years, increasing likely interventions and social impacts. Robots are being developed for use in a variety of locations, including; the home, healthcare, workplaces and the military. Robotics is interesting from an engagement perspective as the robot itself may increasingly 'participate' in engagement (Breazeal et al., 2003). Numerous studies have suggested that engagement and participation are under researched and complex processes, in particular due to the lingering framework of deficit (Rowe et al., 2004; Irwin and Michael, 2003; Irwin, 2001; Rowe and Frewer, 2000).

This project then aims to:

- Examine engagement strategies and their effectiveness, using robotics engagement events as examples.
- Investigate existing public attitudes to robotic technologies and their potential social impacts.



*'I was expecting a lot more information than I got, I really felt as though I ought to have been half my age, you know, I didn't feel as if he was talking to us, I think he assumed, probably because we've got grey hair, we know nothing about robotics.' (Audience Member, University of the Third Age Lecture)*

## Methods

The project has utilised predominantly qualitative methods, to inform the research questions.

**-Observations** - At least two investigators have observed a series of events with contrasting features, lengths, levels of audience participation and so on. Video recordings have also been made at events, subject to ethical agreement, building on previous work where they have been used to examine interaction in museums and galleries (Heath & Lehn, 2004).

**-Interviews** - Interviews have been conducted with both engagers and participants. As Rowe et al. (2004) highlight, evaluations of participatory activities often focus on the audience's attitudes, ignoring other expectations. The interviews sought to explore attitudes to the engagement experienced, reflection since the event, and perceptions on the impact on attitudes.

**-Analysis** - Qualitative data has been recorded, coded and analysed using Nvivo. We have based the analysis on Ritchie & Spencer's (1994) Five-Step Framework analysis, where by the investigators have set out to agree upon and negotiate common themes and key findings across each of the datasets.

*'I got a few of the slightly more naïve questions off line, you know not in front of everybody which makes sense people were a little like...knew a little and wanted to come and ask...during the breaks or afterwards, but even there they seemed seriously interested and were thinking clearly.' (Engager, Science Café)*



## Results

Key themes raised by the observation data ( $n=22$ ) include organisational issues and their impacts, alongside levels of interaction across different styles of activity. In the semi-structured interviews participants from a range of perspectives, audience ( $n=33$ ), presenter ( $n=13$ ), and organiser ( $n=12$ ) have discussed issues pertinent to them. Key issues raised in the interview data include; perceptions/definitions of engagement, expectations of engagement, perceptions/definitions of expertise, the role of children/young people in engagement and motivations for communicating about robotics. Finally, we have collected approximately 15 hours of video recordings from which we intend to identify key sections of interaction to analyse.

## Conclusions

Although portions of the data are still undergoing analysis, some conclusions can be drawn at this stage of the project. Firstly, the project has highlighted the difficulty in generating comparative analysis strategies for different styles of engagement activities, which frequently have different aims and audiences. Qualitative approaches have been crucial here in offering the flexibility to compare the variety of activities we have experienced. Secondly, the project has capitalised on the rich engagement activities that are ongoing throughout the UK providing an opportunity to gather a perspective on 'public' views and attitudes, in addition to examining engagement as a concept. Finally, gathering perspectives from all participants in engagement activities has provided a rich and contrasting insight into the practicalities and principles of this emerging field of engagement activity.

Engagement Mechanism	Location	Setting	Audience	Approx Audience Size	Methods
University of the Third Age Lecture Generating Genius Robotics Workshop Robotics exhibit	Bath London	Community Hall University Campus Science Museum/Centre	Aged 60+ 'Gifted' 13-14 year olds All ages	150 18 -	Observation Video Interviews Observation Video Interviews
Robotics exhibit	Newcastle	Museum	All ages	-	Observation Video Interviews Observation Video Interviews
Robot Thought Show Jitterbot Robot Workshop Meet the Robotician	Newcastle	Science Museum/Centre Lab Science Museum/Centre	Family Groups Family Groups All ages	50 25 -	Observation Video Interviews Observation Video Interviews Observation Video Interviews
Robotics Art Display Visions Conference	Newcastle London	Science Museum/Centre Learned Society	All ages 16-18 year olds	- 20	Observation Video Interviews Observation Video Interviews Observation
Science Café	Bath London	Pub/Bar Science Museum/Centre	Adults	80 90	Observation Interviews Observation Interviews

Table One: Engagement activities analysed by Talking Robots

Breazeal, C., Brooks, A., Gray, J., Hancher, M., McBean, J., Stiehl, D., and Strickon, J. (2003) Interactive robot theatre. *Communications of the ACM*, 46 (7) 76-84.

Heath, C. and Lehn, D. V. (2004) 'Configuring Reception (Dis-)Regarding the 'Spectator' in Museums and Galleries', *Theory, Culture and Society* 21 (6) 43-65.

HMT, DfES and DTI (2004) *Science and Innovation Investment Framework 2004-2014*. London, HM Stationery Office, 1-190.

Irwin, A. (2001) Constructing the scientific citizen: science and democracy in biosciences. *Public Understanding of Science* 10 (1) 1-18.

Irwin, A. and Michael, M. (2003) *Science, Social Theory and Public Knowledge*. Maidenhead, Open University Press.

Roco, M.C. and Bainbridge, W.S. (eds) (2002) *Converging Technologies for Improving Human Performance: Nanotechnology, Biotechnology, Information Technology and the Cognitive Science*. Arlington, VA: National Science Foundation.

Rowe, G. and Frewer, L. J. (2000) 'Public Participation Methods: A Framework for Evaluation'. *Science, Technology and Human Values* 25 (1) 3-29.

Rowe, G., Marsh, R. and Frewer, L. J. (2004) Evaluation of a Deliberative Conference. *Science, Technology and Human Values*. 29 (1) 88-121.