

Imagine real avatars and flying shepherds: involvement and engagement in generating innovative project ideas

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ABSTRACT

This paper takes as its starting point Kyng's (2010) challenges for future participatory design practices in the context of a technology landscape which has changed enormously since the emergence of both 'Scandinavian' PD and the participatory politics of 1960s US radicalism. We describe the Infinite Bandwidth, Zero Latency (IBZL) project, from its use of the 'Imagine' workshop method to envisage potential technological futures, through to its involvement of stakeholder representatives and potential users in assessing one such vision of potential technological 'futures', the 'real avatar'. IBZL was originally conceived as an intervention in policy debates in the UK about the significance and potential of 'next generation' or 'superfast' broadband networks, and as a way of mobilizing wider audiences to consider the possibility of innovative applications of them. By their very nature, the significance of these networks transcends particular workplaces. This case study describes responses to several of the challenges for PD practice raised by Kyng, including the roles of companies, intellectual property, funding, the involvement of social actors as users, the engagement of users in multiple roles.

Author Keywords

Next generation broadband; participation; social enterprise; robots

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

We take as our starting point Kyng's (2010) challenges for participatory design's 'next practices', in the context of a technology landscape which has changed enormously since the emergence of both 'Scandinavian' PD and the participatory politics of 1960s US radicalism (Arnstein, 1969). We describe the Infinite Bandwidth, Zero Latency (IBZL) (Bell & Walker, 2011; Walker et al, 2011) project, which uses the Imagine and Triple Task methods originally developed in the context of participatory sustainable development. The approach draws heavily on

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ideas from soft systems, and is organised around workshops at which participants are asked to generate potential technological futures. In the IBZL project we have used this approach in two phases of workshops, the first of which generates ideas, and the second aims to secure involvement of potential stakeholders in subsequent development projects. We use the example of one such potential technological 'future', the 'Flying Shepherd' or 'real avatar' which, growing from ideas generated and refined in IBZL workshops, demonstrated 'proof of concept' prototypes to potential users and other stakeholders.

IBZL was originally conceived as an intervention in policy debates in the UK about the significance and potential of 'next generation' or 'superfast' broadband networks, and as a way of mobilizing wider audiences to consider the possibility of innovative applications of them. The significance of telecommunications networks goes beyond individual workplaces, and includes people variously as citizens, customers, innovators, entrepreneurs, educators and social activists. This case study describes responses to several of the challenges for PD practice raised by Kyng, including the roles of companies, intellectual property, funding, the involvement of social actors as users, and the engagement of users in multiple roles. We reflect on the effectiveness of IBZL as a political intervention and in particular the alliances involved in realizing a 'Real Rural Avatars' project, which comprised 'flying shepherd' and 'remote tourist' proof of concept demonstrators. We propose Imagine and IBZL, refined and developed over the course of the project, as outcomes and techniques which can contribute to future PD practice, in particular in widening participation in the very early stages of framing how technologies are viewed.

The paper is structured as follows: firstly, we consider both the wider background of PD and the particular context of 'next generation' networks in which IBZL was conceived. Secondly, we present the 'flying shepherd' case of the IBZL/Imagine. Thirdly, we discuss the implications of the project in the context of Kyng's challenges.

BACKGROUND

Participatory Design in a changing world

The world has changed significantly since the birth of PD both socio-politically and technologically.

Over the last two decades changes in the social and political environments in which participatory design is conducted have seen the decline of trade union influence in the workplace and growing influence of alternative social and political formations (e.g. Kyng, 2010a; Björgvinsson et al, 2010; Shapiro, 2010). Indeed, over the last decade or more, trade union discussions of ICT in Europe appear to have been rather more concerned with the complexities and consequences of how unions themselves can make more effective use of technology (e.g. Martinez Lucio & Walker, 2005; Martinez Lucio et al, 2009) and its potential role in union revitalization strategies, than with asserting influence over the design of technology in the workplace. The politics of identity, as in feminism, the environmental movement and various flavours of nationalist and ethnicity-based movements have emerged globally as powerful bases of global, frequently transnational, social movements (Castells, 1997). More recently still, the global economic crises have triggered responses such as the 'Occupy' and 'UnCut' protest movements which may yet create new and, durable political dynamics. To retain its critical, emancipatory edge, PD practices need to find ways to engage with these new social and political formations.

Technological change has seen use of ICT spread far beyond its organisational and workplace origins to become a routine feature of everyday life for most people, in the developed world at least. Computing devices are no longer generally isolated, but connected (more or less effectively) by increasingly ubiquitous communication networks. Mobile devices and pervasive applications link their users to networked applications and to other people almost permanently. The nascent 'internet of things' (e.g. Gershenfeld et al, 2004) and digital/material 'hybrid' objects (Knutsen et al, 2011) are beginning to link what we have come to think of as a distinct 'virtual' reality to the reality of everyday material objects. Important examples of applications, such as Facebook and Twitter, have established themselves as indispensable to many without an a priori 'need' for them ever having been established (or, indeed, suspected).

Implications for PD

These changes in both the sociopolitical and technological contexts of PD raise issues and questions for the 'new practice' of PD. Here we outline some of these as encountered in the context of the 'flying shepherd' project described in more detail below

Broader perspectives on participation: in her response to Kyng, Karasti (2010) raises the question 'what counts as PD?', suggesting that some characterizations of PD are too narrowly circumscribed, failing to take account of other participatory domains. One such domain is participatory development. Analogously to participatory design, participatory development has both a pragmatic stream, concerned to improve the efficacy of conventional, top down and statist development projects, and a more critical strand which recognises different interests, perspectives and 'knowledges' among grass roots communities (Mohan, 2001). Over a similar timescale to PD, a family of participatory methods and

techniques have evolved some of which may have value in this evolving PD setting.

Stakeholders or users: one feature of participatory development is a wider concern for stakeholders, rather than a narrow focus on users. Stakeholders include anyone who is affected by a particular initiative and who by virtue of that, are seen as having a fundamental right to participate. This immediately raises both political and practical questions of how this participation might best be organised; how stakeholders who may number in their millions might legitimately be engaged or represented in a particular process (Bell & Morse, 2010).

Technological ecologies: even in the workplace, workers are seldom restricted to single workstations, but use a range of technologies with overlapping functionalities, in different places and contexts of use (Bødker; 2009). Typically, devices and applications are increasingly networked, linking to other applications and devices. Not only are technologies a part of everyday life for many people, boundaries of personal, family and work uses even of the same artefact are increasingly blurred. Consequently new technologies can be thought to be taking their place in broader sociotechnical ecologies, rather than being understood as discrete, isolated entities. Some of these technologies, such as autonomous robotic devices (as in military drones) raise new sets of social and ethical concerns, for example around issues of accountability.

New alliances: these developments involve PD researchers and practitioners in building alliances and partnerships with new types of social actor outside the workplace. These include companies, public authorities, and wider civil society organisations such as voluntary organisations and NGOs. Working with new types of partners and their organisations raises new sets of issues. For example, companies often, and for good reason, set great store by protecting their intellectual property rights (IPR); working with poorly resourced community organisations (especially in the context of increasingly competitive research funding environments) risks researchers treating user communities instrumentally; and the complexities of user participation in developer-led open source projects have been identified (Björgvinsson et al, 2010; Kyng, 2010; Iivari, 2009). As well as these pragmatic issues, the choice of partner organisations and stakeholder representatives raises political issues to the extent that PD practice retains a critical and emancipatory edge (e.g. Dearden et al, 2005). As well as negotiating relationships with wider social actors as outlined above, there may be obvious allies in a critical computing project among some of the 'computerization movements' (Kling, & Iacano, 1988) such as those associated with free and open source software (F/OSS) frequently make the kind of critical claims to democracy and (in contemporary terminology) social justice (Elliot, 2008; Sullivan, 2011) that PD traditionally has.

INFINITE BANDWIDTH, ZERO LATENCY AND THE FLYING SHEPHERD

The IBZL project was initially conceived as an intervention in debates around the development of urban

scale broadband infrastructure in Manchester, UK. The following section introduces the technological and social contexts of the IBZL project.

IBZL took a participative approach to ideas generation for applications of 'next generation' (NG) broadband networks with a view both to developing novel applications and informing wider policy debates about what might become possible. Here, we describe the method, following the example of the 'Real Rural Avatars' initiative which emerged from its conception and elaboration in IBZL Imagine workshops through to initial feasibility study and demonstration by Alston Cybermoor, a social enterprise and local broadband technology project in rural North West England. The term 'real avatars' was used to describe remote controlled devices which represent people in the physical, rather than purely digital, worlds, at a distance. It was the first project from the IBZL initiative to secure funding for an initial feasibility study, which included demonstrations of the kinds of technology that are becoming available to potential community stakeholders.

Manchester

The IBZL initiative was a collaboration between academics from The Open University, and Manchester Digital, a trade association of mostly micro- and small-enterprises operating in the digital and creative industries in and around the city. Partly as a result of Manchester City Council's long track record of promoting digital and networked technologies since the late 1980s (see, e.g. Agar et al, 2002) there is a flourishing digital community in the city, and a widespread commitment to involving local community organisations in digital work. Manchester City Council (through its Manchester Digital Development Agency, MDDA) has, since 2008, been working on a digital strategy with high speed broadband connectivity at its centre, and has itself been a member of INCA, working with independent operators. Manchester is also a member of the European Network of Living Labs.

Next generation networks

'Next generation', 'superfast' or even 'transformative' broadband networks feature on the policy agendas of many national and regional governments (see e.g. Cave & Martin, 2010). Next generation (NG) networks, it is frequently argued, are essential to future economic, social and individual wellbeing. Areas of life including education, entertainment, healthcare, economic activity, the environment and more effective and efficient government will, we are to suppose, all follow apparently automatically. However, evidence of the emergence of innovative applications as a result of earlier generations of broadband is mixed (Cawley & Preston, 2007).

In the UK, at least, the development and implementation of these networks is contested. Within what might be termed the broader 'next generation' computerization movement there is a conflict between global telecommunications companies (telcos) and 'community' or 'independent' broadband network activists clustered around organisations such as the Community Broadband Network (CBN) and Independent Networks Co-operative

Association (INCA) in the UK. These clusters include both individual rural and urban broadband activists, social enterprises, SMEs, consultants and in some cases public authorities. While both currents argue for the 'transformative' nature of these 'next generation' networks, there are competing visions both of the industry structure and the kind of underlying technical infrastructure which can best support them.

Assuming that demand for high capacity networks is there, it is not obvious that it will automatically lead to democratic benefits; the most immediate uses of increased bandwidth to carry more TV channels, in higher definition and 3D, appear likely to consolidate the influence of global media corporations, who might not always be seen as promoters or guardians of democracy.

However, this picture also poses a problem for those who would argue for a more democratic approach to design and innovation. If we don't yet know what the applications we are talking about are, how can we identify audiences of (potential) users and stakeholders to engage in participatory design. How can we open up the process of generating genuinely innovative ideas and then engaging users and other stakeholders or beneficiaries of an application?

IBZL Origins

IBZL grew out of debates around these issues among some of Manchester's digital milieu. The motivation for the first workshop was to bring together participants from diverse backgrounds to generate and explore ideas for novel applications of NG broadband. Considerable care was taken to identify an appropriate mix of participants, dependent on factors such as academic/ public/ private/ NGO sectors and disciplinary backgrounds. By 'appropriate', we mean bringing together people with a wide range of backgrounds, such that the chances of innovative ideas emerging was increased. We did not aim to create a group that was representative of specific groups of stakeholders with any claim to representative legitimacy. However, given the involvement of some people working in civil society contexts we hoped at least to broaden the potential range of inputs and, hopefully, the democratic nature of the outputs.

IBZL and Imagine

IBZL is primarily a process for encouraging and harvesting ideas. This process is supplemented by an analytical and evaluatory framework. The entire process is known as Triple Task Method, originally developed in the field of participatory sustainable development, and has been more fully described elsewhere (Bell and Morse 2010). Triple Task Method operates by means of three separate but related engagements. Task 1 is a participatory engagement in problem solving. Task 2 is an observer review of the participatory process and Task 3 is a participant assessment of the workshop process. The three tasks combine in a field diagram which provides a sense of what the group has achieved and how it has achieved what it has achieved (variously described in: Bell and Morse 2009; Bell and Morse 2010; Bell and Walker 2010; Bell and Morse 2011). For the purposes of this paper Task 1 is of primary importance. Task 1, also known as 'Imagine' is a soft systems-based methodology



Figure 2. Categorized and clustered ideas.

Each idea was further described in terms of “what it does” and “what it transforms” i.e. its function and effect. A number of themes emerged from the Phase 1 events including the following clusters, identified by the researchers following the Phase 1 events were presented as the starting point for the Phase 2 workshop to refine as project ideas. These themes were labelled as:

- Topological society – social interaction, group formation and mediation through higher bandwidth connection.
- “Changing Spaces – the space of flows.”
- Ubiquity – Virtual worlds, real worlds and their interconnection as empowering tools.
- Bits and Atoms - Materialising the virtual, the effect of ubiquitous availability.

At the Phase 2 workshop similar rich picture techniques were used to structure and refine the ideas and concepts from the Phase 1 workshops with the aim of identifying potentially viable project proposals; and to identify consortia of participants capable of carrying the ideas forward.

Several ‘candidate project’ ideas were identified at this stage, but here we concentrate on those that formed the basis of the Real Rural Avatars project proposal. Two elements in the ‘Bits and Atoms’ cluster were the ideas of a ‘real avatar’ which might represent a remote user in the material world analogously to avatars in virtual worlds, and the related idea of ‘drones for peace’, and the appropriation of technologies originally developed for military applications. Reflecting the overlap of concerns

and interests of its participants, the small group in the phase 2 workshop which refined these ideas considered them in the context of the kind of rural economy characterised by Alston. Two projects were identified as being sufficiently similar and feasible to merit further investigation. These were:

- The stealth shepherd – use of remote avatars in rural areas to assist with livestock farming; and
- The remote tourist – the use of physical avatars to represent individuals unable to be present in rural areas.

Further discussion produced a group capable of and interested in progressing the project: academics from The Open University, and ACS. Following the Phase 2 workshop, these ideas were firmed up into a proposal for a feasibility study ‘Real Rural Avatars’ investigating the use of remote tourism and livestock management in the North Pennines. The proposal was successfully submitted to the UK Technology Strategy Board (TSB) and received funding. The feasibility study aimed to demonstrate how such avatars might work in this context, as a proof of concept, and to gather feedback from local stakeholders.

A major, unexpected, difficulty with the feasibility study was sourcing devices with which to demonstrate the idea of a physical avatar. A range of mobile devices was investigated, ranging from military equipment such as General Dynamics’ Big Dog and Blue Bear systems iSTART and BlackStart remotely piloted vehicles (RPV), through to various mobile teleconferencing solutions. Most of the military solutions were rejected as too expensive or unavailable for civilian use. Interestingly, most of the, widely advertised, mobile teleconferencing systems were in fact either still at the concept stage or unavailable.



Figure 3. The fixed wing avatar from BlueBear Systems

Our final choice was BlueBear Systems Research (see <http://www.bbsr.co.uk/>) RPV for the stealth shepherd trial and Giraff Systems (<http://www.giraff.org>) Giraff telecare robot for the remote tourist application. Both of these organisations were very helpful with BlueBear providing both fixed and moving wing avatars for the trial (Figure 3) and Giraff organising the loan of a robot (Figure 4) from the Advanced Manufacturing Group at Warwick University. These were then demonstrated to local

stakeholders during a ‘demonstration day’ and feedback was gathered, largely informally, by staff from Alston Cybermoor.

The immediate outcomes of the trial have been reported to the TSB (Cybermoor Services Ltd., 2011), briefly:

- While demonstrating the concept and general feasibility, current devices are not suitable for regular outdoor use and could, for example, suffer problems with vandalism for unattended use. The operators, during the pilot, also reported that the operating the avatar required great concentration, and no trivial degree of skill. One possible route for further development here might be the extent to which ‘delegation’ of control to the avatar might be achieved. Given the state of such devices, then the remote tourist idea is not (currently) a viable idea for widespread use in unattended populated settings, or more rugged outdoor environments.
- The stealth shepherd elicited a great of interest from local farmers, who discussed setting up a consortium to purchase and operate one. As well as general surveillance of flocks of sheep on remote hills, potential applications included spotting snowbound ewes in particularly severe weather, using infrared cameras. The idea also found favour with the local emergency services, where rescuing lost or injured hill walkers is a common activity. They are now obtaining their own device.



Fig. 4 ‘Giraff’ robot loaned from Advanced Manufacturing Group, University of Warwick

DISCUSSION

Here we want to highlight a number of issues which emerged during the IBZL/Imagine process and the

particular case of the ‘Real Rural Avatars’ case. We conclude that the Imagine/Triple Task Method used in IBZL, originally developed for use in the participatory development world provides a broader perspective on who participates with particular benefits for early stage innovation before user groups have been identified. In doing so, it raises political issues of which stakeholders are engaged with, and, echoing points raised by Kyng and others, means that ways of understanding and accommodating new interests in the design process need to be developed.

Our approach to date is, however, open to the criticism of potential elitism and exclusivity in the selection of participants. While we aimed for a degree of disciplinary and organisational diversity among our participants, we did not explicitly address gender or other forms of social diversity in participation. In future use of the Imagine/IBZL approach we need to address issues of legitimacy of participants if the method is to be usable in wider public policy-related areas.

Broader perspectives on participation

Stakeholders not users: As noted above, the participants in the original IBZL workshops were invited on the basis of contributing to a mix of backgrounds, and to some extent attributes, likely to lead to innovative thinking. They had a wider interest in technologies but could not a priori be identified as users of particular applications. We have described here one of the outputs, but there have been a number of others from these and later IBZL workshops, including distributed ‘cloud’ computing models; the potential for networked local fabrication units in challenging traditional supply chains for example in fair trade textile production and using hybrid digital/material resources to in new models of distance and networked learning. To this extent, we can claim that the IBZL method has generated interesting project ideas of which one, to date, has progressed to demonstrator/prototyping with other ideas still under development.

Early stage participation: the IBZL/Imagine approach offers particular value in widening participation in the early, ideas generation phase of development. IBZL/Imagine encourages people to begin with analyzing their current situation and to consider ways they might transform it. This is particularly helpful in a context such as urban broadband development, where it might otherwise be difficult to think about genuinely novel applications before the infrastructure is available, leaving the field open to established actors (such as international media companies) both to plan early applications, and even perhaps, to influence policy decisions about the underlying architecture of the network infrastructure. While technical knowledge is valuable among participants it is not necessary, or even desirable that all participants are familiar with particular technologies beforehand hence broadening the range of potential participants.

Users and stakeholders: in the case of the Real Rural Avatars project, it was initiated by a local stakeholder, rather than directly by potential users. The immediate

next step was to engage users via the proof of concept demonstration. During the planning of the proposal, however, other interests were identified. In particular, in the UK, the Civil Aviation Authority places regulatory limitations on where drones can be flown. For example there are limitations on how close to homes and buildings unpiloted aircraft might fly. This regulation may restrict user freedom, but be quite reasonable in its protection of the safety and privacy of non-users.

New alliances

The 'critical' or social nature of these outputs is not necessarily inherent in the Imagine methodology, but reflects some of the values held by the participants we chose to invite.

Intellectual property: as Kyng (2010) and others have noted, issues of intellectual property rights (IPR) are apparently particularly significant for companies. With our Manchester Digital partner, we spent considerable time before the first workshop considering ways of organising this. At the start of the first workshop we asked participants to treat any ideas generated during the process as commonly held by participants, and open to further exploitation by whichever participants were willing/able to continue working on them. Among the participants from the digital industries, there did seem to be an emerging attitude that IPR is perhaps less important than quickly getting things done and to market (drawing on the lessons, for example, of open source and other crowd-sourced developments). From the researchers' perspective, a lack of acknowledgement of our role in some media coverage of the Real Rural Avatars caused a degree of frustration, because non-academic 'impact' as evidenced by media coverage is being used as an increasingly significant indicator in UK research assessment exercises.

Partners: the Real Rural Avatars case study is an example of how the selection of workshop participants may lead to particular kinds of social outcome. Firstly, Cybermoor Services Ltd is a community-owned social enterprise with deep roots in the local community. While only one person from Cybermoor participated in the first workshop, the close links with the community allowed the identification of applications likely to resonate locally, and bringing a sense of local ownership from the outset. Secondly, its constitution as a successful enterprise meant that the entrepreneurial skills needed to identify and grasp funding opportunities quickly helped to sustain the momentum of the ideas.

Infrastructure and other technologies: although the IBZL proposal was originally conceived in the context of next generation broadband, many of the most interesting ideas generated were predicated on linking other emerging technologies in novel ways, rather than focusing specifically on the networked components. The Real Rural Avatar proposal is an example of this. The proof of concept ideas did not rely on next generation networks (which are not yet available in this area); they used local radio and wireless control. It may be unlikely that the control of a drone in remote regions would ever sensibly

be carried out via a pervasive wireless broadband network instead of dedicated radio control. The 'tourist' avatar, however, controlled potentially from anywhere would be predicated on next generation networks (and in particular, low latency networks).

Funding: the Real Rural Avatars prototyping was possible because, following from the IBZL workshops, additional funding was secured through a proposal to an external funder. Other, apparently equally interesting, ideas have not (yet, at least) succeeded in getting funding. In the original workshops, we treated the idea of a 'project proposal' very broadly. To academic participants, this might be interpreted in terms of traditional research project proposals. Importantly, it might also be interpreted by company participants as the production of a business idea or plan to secure commercial funding. We are currently exploring other methods of taking ideas forward, for example through 'hack camps' and links to potential investors.

CONCLUSIONS

We have presented the 'IBZL' project as a means of broadening participation in thinking about novel applications of next generation broadband networks. We have presented a particular case of progressing one of these ideas to proof of concept prototyping to potential users and other local stakeholders. This approach has provided the opportunity for some stakeholders to contribute to the development of these ideas, though as implemented in IBZL this was not predicated on specific claims to representative legitimacy, though the selection of participants may make this more, as in this case, more likely to engage users and local stakeholders.

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