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Public Engagement Through Shared Immersion: Participating in the Processes of Research

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Abstract

Recently, the literature has emphasized the aims and logistics of public engagement, rather than its epistemic and cultural processes. In this conceptual article, we use our work on surgical simulation to describe a process that has moved from the classroom and the research laboratory into the public sphere. We propose an innovative shared immersion model for framing the relationship between engagement activities and research. Our model thus frames the public engagement experience as a participative encounter, which brings visitor and researcher together in a shared (surgical) experience mediated by experts from a range of domains.

Keywords

immersion; framework model; public engagement; distributed simulation; public understanding of science

Introduction

Since the landmark Bodmer Report in 1985 (Bodmer, 1985), pressure on universities and research institutes to contribute to society through public engagement activities has increased, especially in the United Kingdom (Ward, Howdle, & Hamer, 2008). This watershed marked a major conceptual shift from a unidirectional “deficit” model (which views publics as ignorant of science and scientists as remedying that deficiency) to a “dialogue” model (which acknowledges both perspectives and requires a two-way process). Government and scientists seek to involve publics in policy affairs and decision making, with increasing emphasis on “upstream” engagement as part of the scientific process.

The literature provides numerous theories and models, which set out to describe and predict the effectiveness of such engagement activities. However, established concepts of public engagement are generally argumentative, and mechanisms for framing (enacting) these concepts are not well defined (Rowe & Frewer, 2005). Moreover, publics may participate in

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diverse ways, and communications between stakeholders may take place in different—and often unpredictable—forms and directions.

In this article, we present a new framing for public engagement activities—a “shared immersion model” (SIM)—based on creating a common experience between researchers and publics through joint participation. Our field of activity is clinical care—a domain that resonates with publics at multiple levels. This aspect of our work distinguishes it from other types of science that, although of great interest to publics, may not affect them directly at a personal level.

Our research group is therefore concerned with how realistic physical simulation of clinical environments and invasive activities, such as surgical operations, can provide a window onto a professional world that for many people remains inaccessible. Paradoxically, perhaps, a key characteristic of surgery is that although its workings remain mysterious, almost everyone has experienced it at some level—either directly (as a patient) or indirectly (as a relative or a carer). This sets in train a powerful set of affective responses as well as an intellectual picture of the surgical world. Public engagement with this surgical world tends to be emotionally charged, offering allure and repulsion at the same time.

Our research focuses on simulation as a means of recreating this surgical world, acknowledging the multiple dimensions that such engagement may involve. Traditionally, simulation has been used for training and assessment of clinicians and has taken place out of sight of most publics. Increasingly, however, simulation is playing a role in bringing that closed world into public view.

In this article, we consider the processes by which this creation and progressive refinement have taken place and discuss the place of a collaborative partnership between researchers and publics. We use as an example our group’s concept of Distributed Simulation (DS)—highly realistic, yet portable, low-cost, simulated environments that can be set up in a range of nonclinical locations such as museums and science fairs (Figure 1). The underlying principle is to recreate key elements of a clinical setting, rather than replicating every aspect. This drastically reduces cost and increases portability, while ensuring high levels of perceived authenticity (Kassab et al., 2011; Kneebone et al., 2010).

Our development of the DS concept has been organic, undergoing a continual process of refinement and change. The ideas in this article stem from an early recognition that the orthodox processes of peer review through journal publication take place much more slowly than the pace of development of ideas. We therefore explored the potential of repeated exposure to publics as a research tool in its own right.

The cost-effectiveness, flexibility, and portable nature of our DS design has attracted continuing media and public attention. The flexibility of the DS system allows different participants to engage in medical simulations. The multidisciplinary nature of our research group (including surgeons, design engineers, psychologists, computer scientists, artists, and educators) also helps explore alternative frameworks for implementation of the DS approach outside the arena of medical training. These factors have prompted widespread interest, resulting in invitations from many institutions to participate in public engagement activities.

Rather than finding such activity burdensome, we have embraced the opportunities that it presents (Jacobson, Butterill, & Goering, 2004; Kyvik, 2005; Phaneuf, Lomas, McCutcheon, Church, & Wilson, 2007). At the same time, however, we recognize the need to develop a theoretical framework of public engagement, which can actively enrich and challenge our continuing development.

Concepts, Models, and Mechanisms of Public Engagement

We start by identifying key concepts and mechanisms emerging from the literature of public engagement and communication. Rowe and Frewer (2005) described different types of public participation, based on the flow of information between the participants and sponsors in policy settings. According to these definitions, flow of information can be differentiated and exercised in three domains: public communication, public consultation, and public participation. These domains represent different directions of communication.

Parallel to Rowe and Frewer's (2005) model, two classic models explore the communicative relationship between science and society on public understanding of science. The *diffusion* model is similar to public communication in terms of direction of information flow, where information and knowledge diffuses from scientific experts through a medium of communication to the public. A critical *deliberation* model has emphasized the need for public deliberation and a communication backflow from the public toward science (Joss, 1999). This model laid importance on public consultation and public participation and emphasized the significance of inputs from the public, enabling knowledge creation through the engagement.

Previous concepts and models identified the basic observable structure of public engagement and how mechanisms should be used and interpreted to enable effective communication to take place, often reflecting a transmissive approach. Numerous authors have attempted to list different public engagement mechanisms (e.g., Arnstein, 1969; Rosener, 1975). Recently, for example, Open Innovation/Science (OpenScience, 2010) has blurred the organizational boundaries between scientists and publics through Internet communication platforms, and some researchers have started to argue against the "transmission" view of science. Horst and Michael (2011) describe a model of "emergence," where there is no privileged direction of information flow but where science and society jointly take part as a constitutive force to shape entities. Drawing on Latour (1987), they elaborate the concept of the "event," a coming together and interaction of constitutive elements that change those elements and generate "the new." From our public engagement experience, we have found it helpful to extend the concepts of public engagement with a novel framework, which we have called a shared immersion model (SIM).

Innovative Framing: Shared Immersion Model

Four key assumptions underpin our SIM:

1. Public engagement activities can be *experiential*, involving participation as well as acquisition of information.
2. The *shared experience* constitutes an "event" (see above).

3. Being *immersed* in the shared experience is central, for researchers and publics alike. Critical evaluation of this process is equally valuable for both.
4. Simulation can provide *immersive engagements* between science and publics, especially with health care activity and research.

This model offers mutual benefit, allowing scientists and researchers to “experience” the responses of publics directly. Over repeated public engagement events, this process leads to a productive synergy in research evaluation, especially in fast-moving fields such as ours.

We developed the model (Figure 2) as a two-phase iterative framework for enacting public outreach activities. During Phase 1, the scientists (researchers and/or practitioners) who are involved in the research development or area of practice should be *jointly immersed* in the simulation experience with members of the public during engagement activities. The event produces a simulation experience not only for the public but also for the scientists. During Phase 2, the outcomes of the immersive experience are explicitly used for and addressed by research development and future public engagement design.

Because engagement activity in this model is *experiential*, *immersive*, and *shared* by all parties (shaded region, Figure 2; Phase 1), scientists and public develop a common ground for communication within the agenda of the scientific research project and/or development of an idea. This shared experience encourages mutual trust between all parties, rebalancing the power gradient that often exists between “experts” and “nonexperts” and opening the researchers’ thinking to unexpected insights from fresh eyes outside their field. The “sponsor” in the diagram represents the party funding the research project and/or the public engagement activity. While this will often be a university or research institute, representatives of the public (e.g., government) may sometimes play that role. The sponsor provides an overarching frame, since without support or funding such public engagement activity would not take place. Second, although the outcome of the public engagement activity is the shared immersive experience produced from the interactions of various stakeholders, it is only valuable if the scientists and the representative of the public make use of their experience in further research development and/or future public engagement design (Phase 2), hence its inherent iterative nature.

The Application of Shared Immersion Model (Immersive Development)

To illustrate this process, we draw on a series of public engagement activities in which our own research group took part during the development of our approach to surgical simulation. These activities punctuated our research trajectory, acting as waypoints where we paused and took stock of participants’ responses. The following highlights this sequence of events.

DS was first developed to address contemporary challenges in surgical training, responding to profound changes in surgical practice brought about by technological innovation, shifting social structures, and restrictions in the working hours of clinical staff. In addition to exhibiting at science fairs and festivals, our work was reported in a number of radio, television, and newspaper features (BBC, 2009, 2010; Chang, 2011). As with many science

innovation projects, our first few public engagement activities (Barnet et al., 2007) were “public communication” in nature. From 2010, however, we have been inviting publics to participate in fully immersive surgical simulations.

Our simulations allow publics to enter the activity at an experiential level by jointly participating in surgical activity as members of the clinical team (perhaps by holding a retractor or performing simple tasks under the direction of the surgeon). A key element is the participation in a shared practice where much that is conveyed is not spoken and where communication takes place through gaze, gesture, tone of voice, and stance as much as through words.

We now summarize three recent public engagement forums where we developed these ideas further. In each of these, the clinical team was composed of actual clinicians, who had a deep personal understanding of clinical world.

Cheltenham Science Festival 2010: Operation! Live (ISSUU, 2010)

A surgical simulation within this large science festival (5,000 participants) highlighted the pressures of emergency surgery, presenting a realistic operating theater environment within a temporary marquee. Volunteer participants “scrubbed up” and took part in a simulated laparotomy (exploration of the abdominal cavity) for a stab wound as described above, in view of a larger audience of observers. After each procedure, all participants (clinicians and public) shared their experiences and identified areas of common interest or challenge. We used this process to capture ideas that we had not thought of, expanding our perspectives as researchers and clinicians to include unanticipated responses.

Jamie’s Dream School 2010 (Channel 4, 2011)

Our team was invited by Lord Robert Winston (a leading U.K. figure in health-related public engagement) to feature in a Channel 4 television series following students who struggled at school in the United Kingdom. The aim of the program was to inspire 20 young people who had left education without qualifications, through exposure to inspirational teaching. Building on our previous experience at the Cheltenham Festival (above), we created a full-immersion operating theater environment, which directly involved as many students as possible. A key aim was to show the diversity of the surgical team and the significance of their work. By inviting the students to play different roles in a surgical team, the importance of communication and teamwork was highlighted in the scenario. As in previous simulations, the students were asked to scrub up and work with real clinicians (the researchers).

From our observations and from reviewing the television footage, it was clear that students were jointly immersed in the scenario with our clinician researchers. This experience proved highly engaging for participants, and an unexpected consequence was that one of the students began to consider a career in surgical nursing, requesting an opportunity to observe real surgery at our hospital. The significance of having representatives of the public in simulations was even more obvious to the scientists (clinicians and researchers) in this activity, because the possibility of becoming a real member of the surgical team was particularly important to this group of audience (Phase 2). For our research team, a key

message from this event was how it prompted participants to make connections between the simulated role and possible career opportunities for themselves in real life. This process resulted in a change in perspective for researchers and this public alike.

Camden Arts Centre, “Quite Spectacular”

Our second procedure highlighted a different kind of intervention—treatment of a heart attack by coronary angiography. In this procedure, a flexible wire is inserted into the patient’s coronary arteries through the groin, under local anesthetic. The patient is conscious throughout the procedure, which takes place in an interventional suite staffed by clinicians and technicians and supported by high-technology equipment. A key aim of our simulation was to tap into the perspectives of clinician and patient, inviting members of the public to take both roles. Again, members of the public participated *with* clinicians to enact these stages, providing a shared experience that formed the basis of subsequent critical discussion.

The whole group reflected on the immersive experience collectively after the activity, focusing on the patient perspective, whose importance in surgical education is increasing as more operations and consultations are conducted while the patients is awake. Discussions around this and similar simulations are prompting our research group to develop training programs with stronger emphasis on the patient perspective (Phase 2).

Discussion

The work we have presented offers a new paradigm for public engagement, proposing a shared immersion by researchers and publics to create a joint experience, which forms the basis for fruitful and constructive (though not necessarily comfortable) discussion and debate.

In the examples above, we have invited participation on at least three levels. One is experiential involvement in the process of surgery itself (either as clinician, as patient, or as both). The second is involvement in the processes of *evaluating* these experiences—again a collaborative venture requiring openness, trust, and mutual respect. And the third is participation in an ongoing process of development through which we cumulatively and iteratively refine our research techniques, approaches, and ideas.

The question then arises: How is this different from orthodox approaches to public engagement? First, the process we have described is diachronic, extending over a prolonged period of research development. This stands in sharp contrast to the synchronic perspective of many public engagement events, focusing on single or unrelated episodes. From our perspective, this diachronic process is both iterative and cumulative, providing insights through sustained accretion.

Second, the *character* of knowledge we gain from evaluating such activity is qualitatively different from more traditional approaches. Public engagement of this kind allows encounters with large numbers of people, whose backgrounds and interests are widely diverse. We benefit enormously from seeing our familiar world through these participants’ “eyes of newness,” forcing us to notice events and behaviors to which we have become

habituated and that we often fail to see. In the process, we are able to deliberately invite challenge and seek contrarian views. Though often unsettling, this process is highly productive and helps us avoid complacency.

In addition to presenting the world of surgery through the lens of simulation, we are investigating the *process of translation* between a closed scientific and clinical world and its reception by those who may (or may not) have a strong personal interest. By locating the proxy experience of surgery in a public engagement setting (rather than a true clinical setting), we provide an “intermediate stage”—in Latour’s (1987) terms—which can be interrogated by us as researchers in collaboration with disinterested visitors and/or participants, collectively enriching and deepening our understanding.

Conclusions

In conclusion, we return to Horst and Michael’s (2011) recent framing of public engagement as “event.” In this article, we have attempted to unpick some of the constraints on “event” imposed by the nature of our domain (surgery). Based on over 5 years of practice, we propose a collaborative model, which integrates innovative communicative relationships between clinician scientists and publics through SIM. A two-stage approach not only values the immersive experience shared between scientist and public (Phase 1) but also emphasizes the importance of evaluation after each activity, where scientists should apply the evaluation outcomes in future research and public engagement development (Phase 2). This model demonstrates a practical framework for the “upstream” engagement highlighted in several recent policy statements (e.g., HM Treasury/Department for Trade and Industry/ Department for Education and Skills, 2004; The Royal Society, 2004), in which public debate should take place alongside scientific development rather than “downstream” where technologies are waiting to be exploited.

During the process of applying SIM, we found public engagement activities to be of crucial importance. In particular, the genuine personal immersive experience was particularly rewarding to us as scientists researching human factors in surgical education and surgical simulation design. Our design team is currently analyzing scientific data to demonstrate the empirical implications of this model. Although we have described this SIM within a health care setting, the framework is not limited to the field of medicine. The model serves as a reminder of the scientific benefits to be gained from public engagement activities and from trust between publics and scientists, which is such a critical part of that process. Our aim in this article is to draw on our experience of clinical simulation to provoke debate and discussion.

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Bios

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Figure 1. Distributed Simulation surgical environment: (A) a self-contained and enclosable space; (B) a portable operating lamp (stand only shown); (C) pull-up banners; (D) video cameras (part of audiovisual system) mounted on enclosure wall and operating lamp stand

Figure 2.

Shared immersion model

Note: Shaded region represents the immersive experience that is shared by all parties and explicitly used for our own research program development.