



## Learning from discomfort

### Science communication experiments between diffusion, dialogue and emergence

Horst, Maja

*Published in:*  
Knowledge and power in collaborative research

*Publication date:*  
2013

*Document version*  
Early version, also known as pre-print

*Citation for published version (APA):*  
Horst, M. (2013). Learning from discomfort: Science communication experiments between diffusion, dialogue and emergence. In L. Philips, E. Gunnarsson, M. Kristensen, & M. Vehvilainen (Eds.), *Knowledge and power in collaborative research: A reflexive approach* (pp. 21-41). London: Routledge. Routledge advances in research methods, Vol.. 6

## Learning from discomfort

### - Science communication experiments between diffusion, dialogue and emergence

Maja Horst, Copenhagen Business School

During the last decades the theory and practice of Science Communication and Public Understanding of Science have evolved to stress the need for dialogue and engagement with the audiences (Cheng et al., 2008; Hagendijk & Irwin, 2006; Irwin & Wynne, 1996). In my own studies of the public debate about biotechnology (Horst, 2003; Horst, 2005; Horst, 2007; Horst, 2008b; Horst, 2010a), I have been very inspired by these developments, and in 2004 I began to work with a spatial designer in order to try to 'take my own medicine' about dialogical science communication. The collaboration resulted in the creation of 2 spatial installations (in 2005 and 2007), both of which were designed to communicate social science research on the social, cultural and ethical aspects of emerging biotechnologies in a way that would invite visitors to the installations to participate in shared sense-making about the issues. A central principle of the work with the installations was to make the invitation to participate as open as possible in order to facilitate an inclusive dialogue, which would enable the visitors as well as the researcher and designer to learn from the encounter. In retrospect, however, I have come to consider the notions of "dialogue" and "openness" as much more complicated than first imagined. The translation from theory about engagement to actual practices has been a process which has turned out to be more complex, interesting and frustrating than expected. This chapter critically discusses my experiences with these two spatial installations as well as the epistemological and ethical implications of the ambition of doing dialogue.

In what follows, I will take my starting point in an analytical distinction between three different models of science communication, which has grown out of the scholarly tradition of Public Understanding of Science (PUS) over the last decades: the model of diffusion, the model of democracy and the model of emergence. Each of the models implies a particular understanding of the communication between 'science' and 'publics', and configure communication actors, the flow of communication and the objective of the communication processes, differently (Horst, 2008a; Horst & Michael, 2011). In the *diffusion model* the key issue is to disseminate a message from science to the public in order to improve the understanding of science by 'the public' (or lay people) (Society, 1985). It allocates a privileged position to science and portrays a general public in need of information and education. The role of the public is passive with regard to the content and form of

science communication, but members of the public are expected to let themselves be transformed into well-educated scientific citizens through the process.

In contrast, the public is considered an active part in the *model of democracy*. This model has been developed on the basis of criticism of the diffusion model and its 'deficit' theory in which public scepticism towards science is understood to be caused by a lack of understanding (Irwin & Wynne, 1996; Wynne, 1995). In this model, publics have a legitimate right to participate in democratic decisions about the regulation of science. Here, the problem is not that the public does not listen to science, but that science does not listen to the public. The solution is therefore to increase the democratic flow of legitimacy from society to science through dialogue about the regulation, objectives and methods of science. The notion of dialogue in this context is often implicitly build on ideas akin to deliberative democracy (Einsiedel & Eastlick, 2000; Goodin & Dryzek, 2006; Hagendijk & Irwin, 2006). It is argued that publics need to take part in deliberation on issues in order for decisions on science and technology to be robust and legitimate.

The third *model of emergence* is less normative and appears out of more recent studies within the area of PUS, in which the categories of 'science' and 'publics' have been more or less dissolved (Irwin & Michael, 2003; Lezaun & Soneryd, 2007). Following this model, the communicative relationship itself is what brings these entities into being. Rather than conceptualising communication as a flow of knowledge or values from one party to another, it is seen as a constitutive force in shaping entities such as science, publics and society. Thinking with this model, it is the public communication about a particular technoscientific innovation, for instance mobile phones, which 'sparks a public into being' (Marres, 2005).

[Figure 1]

Dialogue features prominently in both the model of democracy and the model of emergence. In the model of democracy it is a normative ideal; engagement is conceived as a dialogue between public and science designed to empower the public. Through this deliberation, the public will come to have influence on the regulation and development of science and technology. In contrast, the notion of engagement has a more ontological status in the model of emergence because it is seen as a constitutive force; it is the act of communicating that brings the entities into being. Engagement is understood broadly as a performative process that enable relationships and through this communication process, phenomena such as 'publics', 'science' and 'technology' becomes visible as such. In the model of emergence, the concept of dialogue is less normative

and more a question of constant interaction, but both models share a focus on the importance of dialogue for science communication.

The two experiments with research communication which I will discuss in this chapter were designed with inspiration from the model of democracy and an ambition of facilitating dialogue about the research communicated. During the process of creation and exhibition, however, it became obvious that all three models of communication were needed in order to understand the communication processes that were taking place. We could not design the installations without thinking along the lines of the diffusion model, and when we later struggled to make sense of the experiences with the installations, the model of emergence provided the best guidance. The combination of models, however, introduced a number of issues to be considered, because it poses questions to the role of the researcher as well as the visitors to the installation. It also questioned the idea of dialogue in research communication in a serious way: what does it mean to do dialogue? How do we interpret the contribution from audiences? In what way are the partners in dialogue equal?

The chapter will start with a brief introduction to the design of the installations, which will demonstrate the original efforts to build on inspiration from the model of democracy. The following section will then describe how also the model of diffusion and the model of emergence were necessary to understand the experiences with the installations. Subsequently, the chapter will focus particularly on the consequences of this mixture of different models. One important aspect is the difficulties raised with respect to measurement of effects and validity of experiences. Another aspect is the possible ethical problems of the fusion of visitor-roles: are the audiences to be informed or partners in co-creation? In conclusion, I will argue in favour of a particular ethos on behalf of the researcher: a care of discomfort, which I consider necessary for similar experiments to succeed.

### **Designing installations on the basis of the model of democracy**

The original idea to do research communication through installations were fostered in 2003 in collaboration with the spatial designer, Birte Dalsgaard, who was dedicated to experimenting with the use of space for the communication of social problems. Among her guiding principles was the idea that exhibitions should communicate to the whole body through a plethora of sensory experiences which would stimulate emotional affects as a supplement to purely intellectual influences. We developed a joint vision of using spatial installations to create dialogical research

communication, which did not only speak to the intellectual capacity of audiences, but also addressed the senses in order to evoke emotions, curiosity and engagement.

The collaboration led to the creation of two installations, both of which have been thoroughly documented at the website [www.stamcellenetvaerket.dk](http://www.stamcellenetvaerket.dk). This site also includes background information on the projects as well as pictures of the experiments. The installations were designed to communicate my ongoing research about public opinion-formation on emerging technologies to adult Danes with no specific knowledge about biotechnology. The central idea of the installations was to convey to the audiences that *'technological possibilities do not fall from the sky – they are created in social processes where you have the possibility of participating'*.

Our joint vision for the design of the installations was that dialogue about research should be central. Inspired by the model of democracy, dialogue signalled that communication should be a two-way process and that sensemaking about the issues was not a privilege belonging to the researchers, who could subsequently educate the audience by filling their deficit in knowledge. Rather, all participants in the dialogue should be partners in an ongoing process of sense making around the issues communicated. We did not state any specific intentions in terms of letting the audience directly influence governance of science and technology, but we had a clear sense that dialogue was the basis for engagement with the issues and that the invitation to dialogue would also help empower visitors to take part in the societal debate about the regulation of science and technology.

Research in controversies about science clearly demonstrates that public debate usually takes place around issues in which there is no general agreement about what counts as facts (Brante & Elzinga, 1988; Latour, 1987; Nelkin, 1979). When it comes to communication about facts it is difficult for a researcher to adopt any other role than that of a disseminator, who explains the fact in the most accessible way. Simultaneously, it is hard for non-researchers to find a way to contribute to a shared sense-making process when the issues discussed are considered facts. We therefore chose to focus the installation on the communication of research problems rather than so-called facts. The idea was to share the curiosity of the researcher and the discussions about why something is considered an important research topic with the audiences. This approach would 'open up' (Stirling, 2008) the discussions and invite visitors to take part in a dialogue between partners in which different perspectives would have something to contribute.

The ambition of 'opening up' a space for shared sense-making also inspired us to try to substitute the use of words and language with other forms of communication. Despite, or because of, the fact that social science is primarily done with words, we wanted to cater to the members of society who are not as familiar with words. Our effort to make the invitation to dialogue as open as possible therefore inspired us to use images, physical space and material artefacts to communicate the content of the installation. Dialogue in the installations was therefore not just a linguistic endeavour, but rather envisioned as a mutual process of interaction, in which actions could be interpreted as signs. Overall, our initial understanding of dialogue could therefore be said to focus on the idea of engagement and interaction and shared sense-making through participation.

#### *The stem cell netWork – a social science lab*

The first installation was made as part of a larger research project on the social, cultural and ethical aspects of stem cell research, funded by the Danish Social Science Research Council, and it was called: *The stem cell netWork – a social science lab*. It was created in 2005 as a test model of approximately 80 m<sup>2</sup>. The installation was designed as a three dimensional gaming board, where visitors could move between a series of small rooms, each of which dealt with a particular aspect of stem cell research (See figure 2). Visitors could think of themselves as their own gaming piece in this three dimensional gaming board. In each room, they were confronted with a number of different problematics and encountered different types of questions and choices through physical meetings with different scenarios.

[Figure 2]

The dialogical form was supported by the fact that the appearance of the installation changed in accordance with the different choices made by visitors. For instance, in the '*public debate*' room, visitors were asked to decide whether an extra 100 mill. dkr should be given either to stem cell research or other worthy causes (See figure 3). Their choice was made by putting a black cube in a column on the wall, which meant that they left a trace for the next person to see. While pondering their own priorities, they could therefore contemplate the choices made by previous visitors. Furthermore, they could leave arguments for their priority in designated squares on the wall – and they could cover or un-cover other visitors' arguments. In this way, the room developed as a dynamic witness of the dialogue taking place under influence of the visit to the installation. Through their exchange with the installations, the visitors were also entering into dialogue with other visitors and the installation was making this process visible.

[Figure 3]

Originally, we had imagined that we could place the installation on a public square in Copenhagen. However, due to resource constraints, the installation was made as a mock-up in a basement at Copenhagen Business School and only exhibited to groups of invited visitors. Furthermore, we could only exhibit it for four days, before we had to remove it again. However, in these four days we conducted four focus group interviews with students and communication professionals. We also made a demonstration for academic colleagues, which led to a number of discussions about the purpose and content of the installation (Horst & Sommerlund, 2007; Horst, 2010b). It was obvious that the installation created dialogue in several ways. First of all, visitors did engage with the interactive aspects of the installation, which also meant that the physical appearance of the installation changed throughout the exhibition as described above. Secondly, visitors often engaged in dialogue with each other as they were trying to make sense of the installation. This was particularly true when they entered a new room and were trying to navigate its content. Usually they would first turn to each other and discuss what they were supposed to do and subsequently this discussion would slide towards their opinions on the issues raised and how they would respond to the content of the room. Thirdly, the installation became the object of dialogue and sense-making in the focus groups, where discussions covered both the content of the installation, the knowledge about the social, cultural and ethical aspects of stem cell research, and the way in which this knowledge was communicated through the installation. In general, visitors were very positive towards the installation as a vehicle for research communication and they expressed a liking for the interactive design. Some visitors commented that they would appreciate if we could find a way of making more information about the issues available, but they did not want more information at the cost of less interaction.

#### *The stem cell network II: Landscape of expectations*

The second installation was a continuation of the first experiment and made possible through a specific grant from the Danish Research Council for the Humanities. It was called *the stem cell network II: Landscape of expectations*. Whereas the first model had only been tested on a number of focus groups and colleagues, it was a specific objective of the second installation that it should be exhibited in a public space to a wider audience. Although the grant was relatively generous (approximately 75.000 Euro) it was not nearly enough to make an installation as elaborate as the first test-model. The result was an installation of approximately 35 m<sup>2</sup>, which consisted of 21 big boxes placed in a spiral form (See figure 4).

[Figure 4]

The exterior of the installation offered a visual display of public discourses on expectations towards new technology, with various types of image and statement. The interior of the installation was designed as a row of interactive elements, many of which were inspired by the first installation. Despite our observation that the experience of entering a little room and deciphering its content was an excellent way of creating dialogue among visitors, we had to abandon the general idea of rooms due to resource constraints. We did keep an aspect of this feature, because some of the boxes were so large that visitors could enter and find the interactive element inside, but the overall concept of this installation was not that of a three dimensional gaming board with different rooms. Instead we conceived of it as an elaborate, interactive questionnaire in which many of the boxes became a unit that were designed to make visitors consider a particular question. Visitors could then mark their answers physically and also place voting beads in cylinders in order to record their answers (Figure 5). Questions covered issues such as: What is the role of science in society? How do you think the future is shaped by current science? Who should control the development and use of new technology? Some of the boxes offered a version of the Public Debate room mentioned above, where visitors could leave arguments on white and black slates. Based on the focus group comments about the first installation and the availability of more information, we added a feature called 'knowledge boxes', where visitors could peep through a little periscope in order to obtain 'more knowledge' in the form of graphs, numbers, written explanations etc. about certain elements (Figure 6).

[Figure 5 and 6]

The second installation was exhibited in public five times. This was not as many as we had hoped, but it turned out to be more difficult to move the installation than imagined. The five exhibitions were all used as opportunities for engaging with the visitors and record their reactions. Just as we had done with the first installation, we used surveillance cameras in the installation to record how visitors engaged with the installation. One exhibition took place in a shopping center in the outskirts of Copenhagen, where we wanted to test whether and how the installation would engage random by-passers and we therefore left the installation 'to speak for itself' without our mediation, that is, without having any of us visible as custodians or 'helpers' to visitors (Horst & Michael, 2011; Horst, 2011). The other four exhibitions took place in connection to a series of science communication events: a festival of research, a conference for science journalists, and two academic occasions.



During these exhibitions we took part in discussions with visitors about various elements of the installation. Similarly to the first installation, the dialogue took place in several ways, i.e. between visitor and installation, among visitors, and between ourselves and the visitors. Whereas the dialogue between visitor and installation primarily took the form of interaction and interpretation of signs, the shared sense making was foregrounded when visitors were interacting with each other - and with us – in order to figure out what possible meanings could be ascribed to the installation. It is therefore fair to say that the different forms of dialogue that were enacted through the exhibition were opening up the meanings of the installation and of the dialogue itself, rather than leading to specific outcomes, for instance in the form of a consensus about the use of stem cell research or the regulation of emerging science and technology. In this way, the dialogue of the installation had less in common with the original ideals of deliberative democracy (Goodin & Dryzek, 2006) than with more broad ideals of opening up issues of science and technology to public engagement and participation (Stirling, 2008).

### **Doing dialogue?**

The ambition of opening up issues for dialogue understood as a joint discussion and sense-making process, however, turned out to be more complex than anticipated. Here I will focus on two issues to illustrate the way in which we, as designer and researcher, learned from the installation and came to realize that we had to employ all of the above-mentioned models for understanding science communication during the process of design and exhibition, if we were to understand what was going on. First, I will describe how we had to reformulate the way we thought about the question of messages of the installation and secondly I will discuss the ways in which we had to reformulate our notion of engagement with the audience through the experiences of exhibiting the installation.

A central part of the criticism of the deficit theory of the diffusion model is the way in which this model assumes that the researchers know and the public don't know, and that the point of communication is to package the knowledge of the researchers into messages that the public will be able to understand. Following this criticism our starting point was that we should not be formulating messages for the visitors to comprehend. Rather, we should just invite people to take part in a dialogue, where they had as much right to define and interpret the issues as we had. However, this view was challenged during the practical work with the installations.

During the design phase it quickly became obvious that we *did* have to assume responsibility for the content of the installation in a way that was not altogether different from the diffusion model that I had criticized in my earlier work. If we wanted to engage visitors in a dialogue, we had to create something that they could meaningfully engage with. That is to say, we had to think purposefully about the kinds of messages that the installation were proposing to the visitors as the invitation to engage. Talking about messages in this context should not be interpreted to mean that we imagined that we could design the installation to embody a message, which any visitor could subsequently extract. We were building on the general constructionist and interpretative framework of this book when designing the installations, so when we talked about the creation of messages it was more as a question of considering what it was, that we offered to visitors in terms of setting a scene for sense-making. We were 'encoding' (Hall, 2003) the installation in a way that would suggest certain interpretations and reactions from the visitors, although of course, we knew that the visitors would 'decode' the installations based on their own interpretative frameworks and the social meaning systems they subscribed to. However, given that the installations were a novel form of research communication, which were not familiar to the visitors, and given that we wanted to convey the invitation to dialogue in images and symbols, we did find that we had to be rather explicit and direct when formulating the content of the installation. In this way, we were constantly considering the content in terms of how it would be understood by visitors and trying to simplify the statements in order to direct the dialogue in a way that would suggest certain interpretations by visitors.

The process of designing these messages was complicated by the fact that the first installation was made in collaboration with a research group of 8 social scientists. Whereas the designer and I had made the overall conceptual framework, each of the rooms in the installation was to be built on a theme from work done by one of the researchers in the group. We therefore engaged in dialogue with them about how to extract a central research problem, which could be transformed into spatial communication. This process was not easy, and we had long discussions with the researchers about how to simplify the research in a way that made it possible to turn it into a spatial concept. Despite these difficulties, it was important for the project to make the simplifications acceptable to the other researchers in the group. Normatively they were partners in the project and we could not just discard their objections to our simplifications. Equally important, however, the tensions around simplifications were central to improving and validating the conceptual development. When we kept discussing a tricky issue instead of trying to close it down as quickly as possible, we had the opportunity to learn even more about the way in which the research could and should be understood. In practice this did not always happen, as we sometimes just exhausted ourselves and

our colleagues by going round and round the issues until time was up. But the principle was important and the discussions about each of these research projects did provide me, as a fellow researcher, with a more comprehensible understanding of the research of the other group members which was very useful in later research collaboration.

In theoretical terms this conceptual development was a process of translation, in which we together explored 'what could be associated with what', in the terms of Actor-Network-Theory (Latour, 1987). The actors in this process, to follow the language of Bruno Latour, was not just the researchers and designer, but also non-human agents like laws of gravity, economic resources, physical space, notions of visitors as target groups etc. Creating the installation can thus be seen as a complex process of negotiation which did not just let us explore what we could associate with what (at what cost), but also changed the researcher and designer in the process. We simply understood more about the research and design after the process, but we also changed our identity. I have elsewhere (Horst, 2011) written about how we turned from a researcher and a designer into two researcher-designers (or designer-researchers) because we did not just stick to our roles as either or. Instead the designer began to speak knowledgeably about research and the researcher began to design. We also subsequently changed into 'those who made that installation', which has changed our subsequent trajectories in different ways. In this way, 'crafting the message' can be understood both in terms of diffusion, but also in terms of emergence. We were trying to think strategically about how to get visitors to interpret a message in what we considered the most productive way, but we were simultaneously emerging as researcher-designers in a particular way. Latour has explicitly presented translation as a counter-concept to diffusion (Latour, 1986). Whereas this is a fruitful starting point for an *analysis of practice of communication*, the experiences with the installations have demonstrated that diffusion and translation might be less contradictory and more connected when *practicing communication*.

### *Engaging with visitors*

Despite our best effort to craft the installations so that the messages and invitations to engage were as clear as possible, it was our ambition to let visitors decide how they wanted to engage with the installation during the process of exhibition. We proposed the installation as an invitation, but it was to be left to the visitors how they wanted to make sense of it. Despite this general ambition of openness, we were still surprised at the degree to which visitors would engage with our installation in ways that were different than we had imagined or intended. At first, we simply interpreted this as a way of letting people open up the issues and respond to the installation in their own way.

However, we gradually came to think about this in a different way as an important opportunity for learning.

As described earlier, the second installation was designed as an interactive questionnaire, where visitors were asked to provide answers to questions, possibly add new answer categories and also leave comments for each other to see. These features were designed to let the installation demonstrate the public sense-making about the issues as a process of dialogue, where one statement has the possibility of influencing the next. But it would also let me tap into the dialogue with the purpose of doing research on public opinion formation. Nevertheless the actual process of dialogue during the exhibition left me feeling rather disappointed. The answers and opinions formulated by visitors were very much in line with what I had already seen in previous analyses of the debates about biotechnology and emerging science (Horst, 2003). Whereas it was not irrelevant to see these types of answers in the setting of the installation, it did not provide much new information or knowledge for me as a researcher. I therefore found it difficult to argue that I was learning from this aspect of the engagement.

In subsequent reflections on how I was to learn something from the experiments, I realized that I had to focus on different aspects of the engagement with visitors, if I wanted to pursue the notion of research-based learning from the experiments. In particular, I had to focus on all the situations in which visitors did something unexpected, or did not comply with what we, the designers, had intended them to do. Often I had noted these instances with curiosity, mild amusement or even irritation that people would not 'take my installation seriously'. A good example of this was found in the exhibition in the shopping center, where various teenage girls would write comments like 'my biggest fear is that shopping centers will close'. They would also play with the surveillance cameras which fed directly to a screen on the outside of the installation. One of the girls would act in front of the camera and another would stand outside and take pictures of her friend on the videoscreen. At first, I interpreted this as a lack of understanding of the installation, but I kept pondering about it and realized that they offered me important information about my own latent expectations about publics and their behavior. In collaboration with Mike Michael, I began to understand these instances of unexpected reactions through the lens of the model of emergence (Horst & Michael, 2011). Rather than disregarding these occasions as disturbance and lack of understanding, they should be regarded as an opportunity for the researcher to learn about how communication is constitutive of the entities we normally take for granted. Reinterpreting these situations, we argued that these situations reminded us that

Although one of the objectives for doing science communication might be the noble one of enabling visitors to engage and participate in democratic decision-making on science and technology, it is important to reflect on the normative justification for, and the kinds of activities that are sidelined in realising, this ambition. Although the teenagers' focus on the camera and their own shopping experience might seem less important or serious to the science communicator, this is purely a question of perspective. Socially speaking, the visitors' apparent lack of seriousness with regard to the issues of science and democracy serves the highly serious situated enactment of their social relations within a group of girls. Indeed, to treat the installation seriously (according to a traditional perspective) would be tantamount to challenging or trivialising the social relations – of not treating the group seriously. (Horst & Michael, 2011)

In line with this argument, the examples of this section have demonstrated how the practical work with the installations have challenged my preconceived ideas about different models of communication as well as my preconceived expectations about what dialogue is and should be. Rather than being ideologically distinct, the three models of science communication introduced in the first section of this chapter, serve to highlight particular aspects of a given practice. They are all necessary to understand the experiences around the installations and it is therefore more fruitful to consider them in combination rather than as oppositions to each other.

A number of implications can be drawn from this combination of models. Here, I want to focus on one in particular. The blend of models makes the status of the visitors in the installation multiple: in the model of diffusion they are perceived as audiences to be informed, in the model of democracy they are perceived as partners in the knowledge production, and in the model of emergence their contribution is primarily to be interpreted by the analyst of the event. In the remainder of the chapter I will discuss the implications of this mixture of roles, because it complicates the understanding of science communication as dialogue. We can no longer just say that researchers should be open to the contributions from their dialogue partners. Rather we have to distinguish between various forms of openness and acknowledge that researchers as science communicators 'use' audiences in various ways. Sometimes we invite audiences as co-constructors of meaning and other times we use them as objects, whose actions are interpreted in our rendition of the events. This is not necessarily a problem, but it warrants certain reflections about validity, effects and the symmetry of dialogue. Of course, audiences are always co-constructors of meaning within a constructionist framework such as the one influencing this book and its chapters. The point I am

making in this context is more a question of perspective. In the model of democracy the point is to improve a social and political situation through dialogue and engagement. A central precondition for this is to treat all partners in the dialogue as equal and with a legitimate right to speak. In the model of emergence, however, the central concern is one of description and understanding. The consequence of this is that the interpretations are made from the point of view of the researcher in a way that renders the other actors in the communication process objects to be interpreted. In what follows, I will elaborate on these differences and discuss how researchers and research communicators can deal with them in a way that does not erode the respect of the audience in its mutual roles.

### **Effects and validity**

The first feature I will consider is the question of validation of claims in dialogical research communication. In relation to the installations, two aspects of validation have turned out to be important. The first aspect deals with validation of the installation as communicating a certain form of research based knowledge: Is the installation a credible translation of the knowledge produced by the involved researchers? As described earlier, this form of validation of the first installation was made through discussions with the group of researchers. Whereas we did not exhaust all discussion points, all the researchers were happy with the final installation and seemed to regard further debate as a positive way of keeping discussions open and alive. In the second installation there were no other researchers involved, but the validation of the installation was done in the process of going back and forth in a constant iteration between basic research and conceptual design. This form of validation was continued during the exhibitions of the installations because visitors would sometimes ask about conceptual ideas and we would discuss whether a particular feature of the installation expressed this idea or not. These episodes demonstrated how the validation of the installations as communication devices is not an effort that is made once and for all with a certain result. Rather, it is itself part of the dialogue about the installations and an integrated element of everything that happened in connection to the installations. Even writing about them several years after they have been scrapped is a form of validation through the discussion of how we are to make sense of such experiments.

This is connected to the second aspect of validation that I want to discuss. This is related to the question of effects: Did the installations provide the kinds of effects on visitors that we intended? It should be noted that we have not had very explicit or strict demands of effects measurements in the process of building the installations. Given that the projects were highly experimental we were able to receive funding without very precise requirements of this sort. However, we have naturally

been asked what we intended to achieve and we would present our objectives as I did in the first part of this chapter. During the process of working with the exhibition we have had a number of indications that visitors were indeed being influenced in ways that we intended and we also have a number of different data that sustains this interpretation. I have written about these data elsewhere (Horst, 2010b; Horst, 2011). In this context, I therefore want to point to a reverse and different argument. Despite our firm experience that the installations produced a great deal of engagement, participation and experience on behalf of the visitors, our documentation for this claim is rather weak. We do, of course, have a lot of evidence that the installation produced interaction, but how this interaction is related to dialogue and engagement and how this dialogue might have had effects in terms of sense-making and empowerment is not very clear. There are a number of reasons for this and I will mention a few because I believe that this is a central feature of experiments like these installations.

One reason stems from the fact that the installations were designed to communicate social science with as little use of words and language as possible. Following this objective we quickly had to give up the idea that we could explain the rather complicated social science theories to the visitors. The installations demonstrated basic axioms from Actor-Network-Theory (See fx Latour, 1987; Law, 1986; Law, 1991), but it was not possible to design the installation, so that a visitor would understand the theories simply from visiting the installations. We therefore settled for the ambition of letting people experience the installation and discuss the controversies about for instance, stem cell research, rather than trying to get them to understand social-philosophical theories about how such controversies can be understood. This is what we meant by stating that we wanted to let visitors *experience* the social science, rather than *understand* it. But these choices meant that we have not been able to use sense-making or understanding as a marker for effect of the installation.

Secondly, the focus on invoking curiosity and emotions through sensory and kinesthetic experiences in itself posed a problem for documentation of effects, because our traditional social scientific methods of, for instance focus group interviews, demand that information is conveyed through the medium of words. A background in science and technology studies, sociology and public communication did not provide a large selection of tools for the documentation of affects and emotional experiences. Whereas this could probably have been helped by contact to other academic areas, the work with the installation did not really permit time to venture into such explorations. Once the creation of installations gathered momentum, all we could do was to try to hang in there. We did make one effort to account for non-verbal experiences by letting our focus group participants answer some of our questions through selection of different pictures (Horst,

2010b), but in general we have not been able to include proper methods for investigating and documenting emotional effects and experiences.

A third and very important reason for the lack of documentation of effects stems from the fact that collecting this kind of information turned out to be at odds with our wish to make the installation dialogical and open to different interpretations. In the focus group discussions we experienced that whereas participants said they profited from the visit in the installation, they found it hard to specify how and what they had picked up, and if we had questioned them more, it felt like we would end up intimidating them. It was also clear that there were a number of different interpretations of various aspects of the installations, and if we were to stick to our ideals of dialogue we had to be careful of how we entered those discussions, because we could easily be seen to be judging whether the visitor's perceptions were right or wrong. In this way, our ideals of openness and dialogue meant that we felt an obligation to respect their experience and that we would somehow violate these experiences, if we tried to dissect them in order to establish documentation of effects.

Altogether these experiences reminded us about the difficulties in effects measurement when it comes to communication products. But instead of lamenting the fact that we are not able to produce precise effects measures, we should maybe realize that this is not possible. This of course, does not mean that we should not be interested in questions of effect, but it should be treated as a constant challenging part of the dialogue. Rather than being a question of acquiring the right set of tools and methods to measure effects and validity, there is a constant demand on the individual researcher-designers to engage in discussions about validity and effects. By constantly being willing to try to understand the way different people make sense of the issues being communicated we will have a chance of gaining deeper knowledge about the way in which efforts like the installations come to count as valid renditions of a state of affair as well as how our efforts might affect the people we aim to invite into the discussion.

### **The symmetry of dialogue?**

Above, it was described how we experienced that we had to tread lightly in responding to visitors' interpretations of the installations because we did not want to be seen to be judging some interpretations right and others wrong. Inspired by the model of democracy we had an implicit ideal about treating visitors' interpretations as just as valid as our own. We had made the installation as a starting point, but visitors were invited to be co-creators of the content of the installation through their engagement with the interactive features and we intended to treat their contributions as



symmetrical to our own. However, the experiences with the installation have demonstrated the inherent challenges of this ideal of symmetry.

In one of the focus group discussions, for instance, one of the visitors was arguing that she would have liked the installation to convey more knowledge about the issues at hand. She felt that she needed more information in order to be able to engage with the issues. Since she was also a curator in a science museum, we originally interpreted her comments as based on her professional norms and practices. We thought that because she was used to work in settings that were inspired by the model of diffusion, she was reading our installation from this perspective, which was at odds with our intentions. Whether our interpretation was correct does not really matter, because either way, it left us with a problem of how to act on her comments. If her view was correct and more information was required, then our whole approach to the installation was fundamentally flawed. But if we decided she was wrong, then we were not being symmetrical in our approach. We did not solve this conundrum, although we did include the feature of 'knowledge boxes' in the second installation to include her comments.

The ideal of symmetry was also involved in the ambition to let the work with the installations feed into the social science research they were based on. However, as described above, visitors' reactions turned out to be very similar to what I had already encountered in other forms of research. I realised that I had asked questions through the installation, that I was not really interested in hearing the answers to. It was not until I changed the perspective and started looking at these disturbance from the point of view of the model of emergence that I was able to actually learn something new from the engagement. However, in doing this, I was again departing from the ideal of symmetry. When I write about the teenage girls playing with the cameras, I construct the story to suit my own practice (as a researcher) of learning and writing papers. This, of course, is also true when I lament the fact that I have insignificant proof of how visitors were influenced by their visit to the installations. This is not at all a problem for the visitors, but only for me as a researcher. The fact that I cannot document effects is not relevant for the dialogue itself, but only relevant for the subsequent justification of the installations as a worthwhile experiment.

The experiences therefore point to the inherent challenges in the ideal of symmetry when applied to a situation in which one part, the designer-researchers, have a particular set of objectives and ambitions with creating an experiment of dialogue. Since our objectives were not the same as the visitors – they could have many reasons for choosing to engage with the installations, but they would not have been like ours – the ideal of symmetry has to be given up at some point. While we

could treat visitors with respect and acknowledge their different contributions as valuable contributions to the installation, our engagement around the installation could never be symmetrical.

The asymmetry is not necessarily a problem, but it should prompt us as researchers to realise the need to distinguish between different roles. As analysts and science communicators we should not try to hide our many-faceted use of audiences behind a veil of apparent openness and dialogue. Rather we should be transparent about the way in which we chose to use audiences in different roles. Sometimes we invite them to engage in dialogue and respect their statements in a symmetrical way. But we also try to influence them to understand particular issues in a specific way, and sometimes we treat them as objects of our own knowledge production. Whereas dialogue and symmetry are important principles for democratic discussion about the role of research, it is not necessarily always coherent with ideals of doing research, because our objectives might not be in accordance with those of our audiences.

#### *Caring for discomfort*

In general, the experiences with the installations have prompted a lot of reflections about the purpose of research communication and the ethos of the researcher and research communicator. Despite the original objective of learning from the installations in a way that would feed into research, the direct dialogue with visitors did not produce the most interesting results. As the foundation for the model of democracy, deliberation is a valuable principle of engagement, but this form of dialogue had to be supplemented with an attention to the unanticipated reactions according to the model for emergence, if the installation was to produce insights beyond the initial understanding of the researcher. In this way, the sense of irritation, discomfort or fragility served as a very productive sign that something needed attention as a source of knowledge.

In general, I have found that a sense of discomfort often works as an alarm signal that calls for further investigation. The important point is to make oneself cope with the unpleasant feelings and try to understand their origin, instead of just trying to get beyond them as quickly as possible. In this sense, the ability to learn from these experiments can be seen as an ethical commitment to deal systematically with, and cultivate, *discomfort*. The researcher should care for discomfort – much in the same way as we care for plants in our garden or other living things that need our support to develop – because it is an important source of new insights. In that sense, the researcher's body can be seen as a sensory piece of equipment which reacts to feelings of fragility and unease, in a way that directs the attention to possibilities for learning.

Dealing with, and caring about, discomfort can be seen as an ethical stance. It is a moral obligation which follows from the involvement of other people in ones experiments. When engaging a number of people in dialogue, we are spending their time and attention which could have been directed at something else. Just because something bears the name of dialogical research communication does not mean it is necessarily worth doing. The least a researcher-designer can do in such a situation is to be willing to learn from the engagement, even when there is a sense that part of the experiment has just gone wrong. Learning from the encounter, however, is not equivalent to giving voice to the audience. It is a method of research which is just as asymmetrical as the traditional model of diffusion.

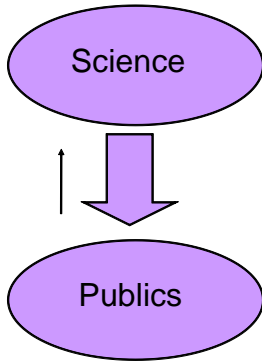
In retrospect, I do not believe that the installations 'went wrong'. They did not provide the public with a forum for deliberation that could influence the democratic governance of science and technology, but they might well have made a lasting impact on the visitors in terms of thinking about the development and regulation of science and technology. They certainly also produced a lot of insights and reactions regarding the purpose and conduct of research communication and the dialogue around them has definitely influenced the way I, as a researcher-designer, practice and talk about science communication.

## References

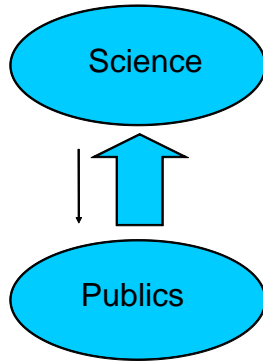
- Brante, T., & Elzinga, A. (1988). Kontroversstudier:Förslag till ett forskningsprogram. *VEST*, (5-6), 59-67.
- Cheng, D., Claessens, M., Gascoigne, T., Metcalfe, J., Schiele, B., & Shi, S. (2008). *Communicating science in social contexts: New models, new practices* Springer Science+Business Media B.V.
- Einsiedel, E. F., & Eastlick, D. L. (2000). Consensus conferences as deliberative democracy. *Science Communication*, 21(4), 323-343.
- Goodin, R. E., & Dryzek, J. S. (2006). Deliberative impacts: The macro-political uptake of mini-publics. *Politics & Society*, 34(2), 219-244.
- Hagendijk, R., & Irwin, A. (2006). Public deliberation and governance: Engaging with science and technology in contemporary Europe. *Minerva*, 44, 167-184.
- Hall, S. (Ed.). (2003). *Representation - cultural representations and signifying practices*. London: SAGE Publications.
- Horst, M. (2003). *Controversy and collectivity - articulations of social and natural order in mass mediated representations of biotechnology*. Copenhagen Business School, Doctoral School on knowledge and management:
- Horst, M. (2005). Cloning sensations: Mass mediated articulation of social responses to controversial biotechnology. *Public Understanding of Science*, 14(2), 185-200.
- Horst, M. (2007). Public expectations of gene therapy: Scientific futures and their performative effects on scientific citizenship. *Science, Technology & Human Values*, 32(2), 150-171.
- Horst, M. (2008a). In search of dialogue: Staging science communication in consensus conferences. In D. Cheng, M. Claessens, T. Gascoigne, J. Metcalfe, B. Schiele & S. Shi (Eds.), *Communicating science in social contexts* (pp. 259-274) Springer.
- Horst, M. (2008b). The laboratory of public debate: Understanding the acceptability of stem cell research. *Science and Public Policy*,
- Horst, M. (2010a). Collective closure? public debate as the solution to controversies about science and technology. *Acta Sociologica*, 53(3), 195-211.
- Horst, M. (2010b). Le Réseau des Cellules Souches - Une Installation pour Communiquer les Sciences Sociales. *Questions de Communication*, (17), 129-150.
- Horst, M. (2011). Taking our own medicine: On an experiment in science communication. *Science and Engineering Ethics*, 17(4), 801-815.
- Horst, M., & Michael, M. (2011). On the shoulders of idiots: Re-thinking science communication as 'event'. *Science as Culture*, 20(3), 283-306.
- Horst, M., & Sommerlund, J. (2007). StamcellenetVærket. om videnskab, modstand og muligheden for samfundsvidenskabelige laboratorier. In L. Koch, & K. Høyer (Eds.), *Håbets teknologi: Samfundsvidenskabelige perspektiver på stamcelleforskning i Danmark* (pp. 275-287). København: Munksgaard.
- Irwin, A., & Michael, M. (2003). *Science, social theory and public knowledge*. Maidenhead: Open University Press.
- Irwin, A., & Wynne, B. (Eds.). (1996). *Misunderstanding science?*. Cambridge: Press Syndicate of the University of Cambridge.
- Latour, B. (1986). The powers of association. In J. Law (Ed.), *Powers, action and belief* (pp. 264-280). London: Routledge.
- Latour, B. (1987). *Science in action*. Massachusetts: Harvard University Press.
- Law, J. (1986). In Law J. (Ed.), *Power, action and belief*. London: Routledge.
- Law, J. (Ed.). (1991). *A sociology of monsters: Essays on power, technology and domination*. London: Routledge.
- Lezaun, J., & Soneryd, L. (2007). Consulting citizens: Technologies of elicitation and the mobility of publics. *Public Understanding of Science*, 16(3), 279-297.
- Marres, N. (2005). Issues spark a public into being. A key but often forgotten point of the Lippmann-dewey debate. In B. Latour, & P. Weibel (Eds.), *Making things public - atmospheres of democracy* (pp. 208-217). Cambridge, Massachusetts: The MIT Press.

- Nelkin, D. (Ed.). (1979). *Controversy: Politics of technical decisions*. Beverly Hills: Sage publications.
- Society, R. (1985). *The public understanding of science*. London: Royal Society.
- Stirling, A. (2008). "Opening up" and "Closing down": Power, participation, and pluralism in the social appraisal of technology. *Science, Technology & Human Values*, 33(2), 262-294.
- Wynne, B. (1995). Public understanding of science. In S. Jasanoff, G. E. Markle, J. C. Petersen & T. J. Pinch (Eds.), *Handbook of science and technology studies* (pp. 361-388). Thousand Oaks: SAGE Publications.

Model of Diffusion



Model of Democracy



Model of emergence

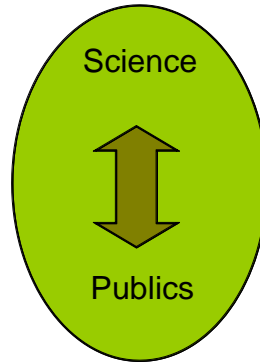


Figure 2: Ground plan of The stem cell network – a social science lab

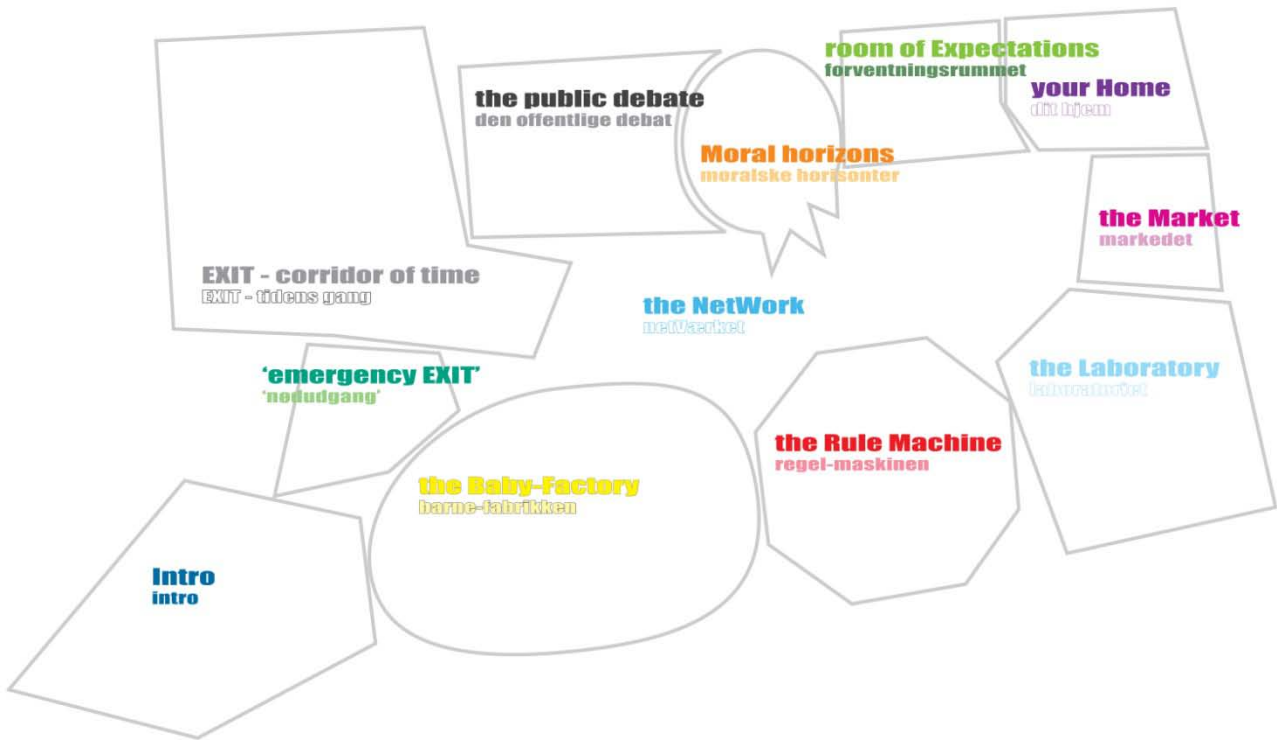
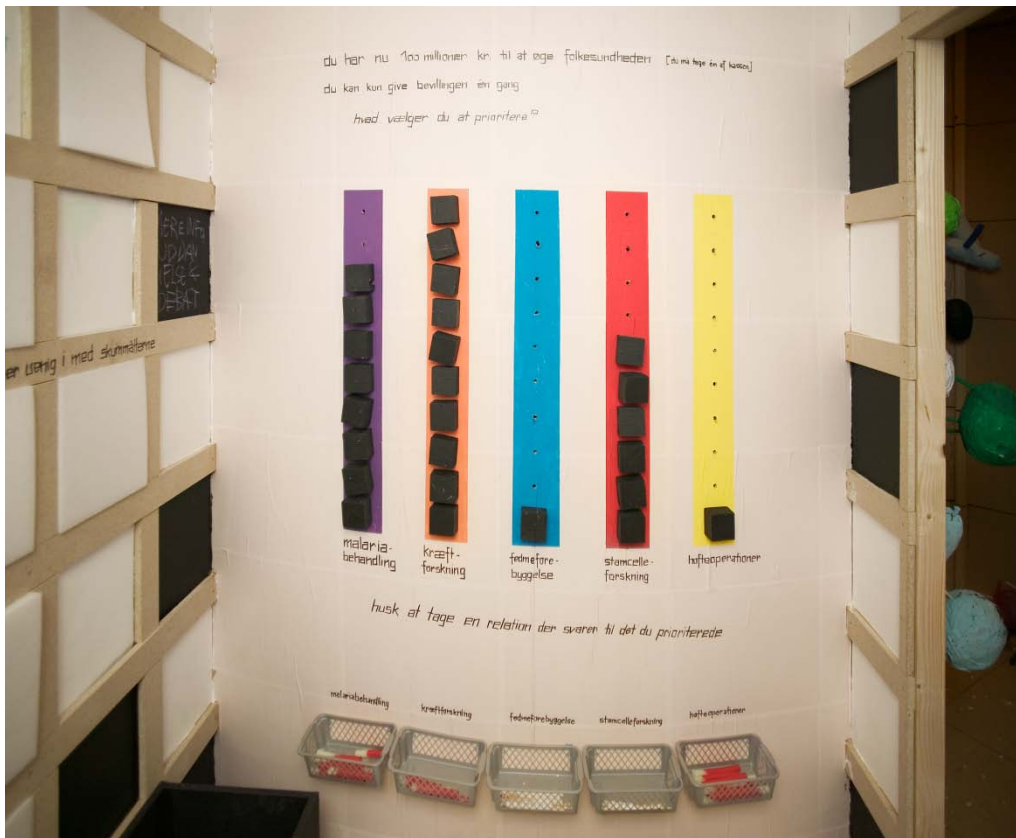


Figure 3: Public Debate Room



Note: The columns symbolize areas which visitors could choose to support with money (one black cube symbolizes 100 mill DKK). The purple column is malaria treatment, orange is cancer research, blue is obesity prevention, red is stem cell research, and yellow is hip replacements.



Figure 4: The landscape of expectations



Picture 5: an interactive question box



Picture 6: a knowledge box.

