

Article

Between understanding and appreciation. Current science communication in Denmark

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In this paper I use the concepts “understanding of science” and “appreciation of science” to analyze selected case studies of current science communication in Denmark. The Danish science communication system has many similarities with science communication in other countries: the increasing political and scientific interest in science communication, the co-existence of many different kinds of science communication, and the multiple uses of the concepts of understanding vs. appreciation of science. I stress the international aspects of science communication, the national politico-scientific context as well as more local contexts as equally important conditions for understanding current Danish science communication.

Keywords: Public understanding of science, Social participation to science

A recent focus study in the *Journal of Science Communication*, based on experiences and reflections from the Eighth PCST Conference (Public Communication of Science and Technology) held in Barcelona in 2004, highlights the great cultural diversity both within science and research communication (hereafter simply called science communication) and within science communication studies.¹ Since then, other focus articles have discussed science communication in countries as different as Brazil, India and China.² A preliminary conclusion from these analyses is that national and regional contexts contribute to shaping the purpose, means and results of science communication.³

In a similar way, another large report, called OPUS, on science communication in six European countries highlights the heterogeneity and variety between the different countries studied.⁴ The report concludes that it is difficult, if not impossible to develop common criteria for good science communication practise, and also to transfer science communication initiatives from one national context to another. This being the case, it is necessary to gain understanding of the contexts that influence innovations within science communication. As I will argue in this paper, these contexts are not necessarily national but may also involve international networks, thus connecting the national and the international levels.

On behalf of the Wellcome Trust, the British firm Research International conducted a survey of British science communication.⁵ The surveyors identify a number of different science communication projects, each of which has its own aims and target audience. As a result of their width, some projects overlap while others are complementary to each other, if not divergent. The survey also mentions that a lot of the projects studied take a special interest in supporting dialogue. The fact that more people today wish to and feel competent to engage in two-ways communication with scientists, supports this observed trend.

In Denmark, current science communication is also shaped by national agendas and culturally determined views of both science and communication. Science communication is a hot topic in today's Denmark, especially as a result of the new University Act, which came into force in May 2003.⁶ The Act lists science communication as a third obligation for the universities, in addition to research and teaching. Danish universities are intended to play an increasing role in communicating science which is also the case in many other European countries.⁷ Consistent with European developments, the reasoning behind the new University Act is the Government's desire to attract younger people to science education and the will to make the universities more socially accountable.

Alongside the passing of the Act, the Ministry of Science established a science communication think-tank and this think-tank's work and final report have also contributed to the increased focus on science communication in Denmark.⁸ The think-tank immediately aligned itself with the new University Act in giving a lot of importance to the dialogue between researchers and the public. Both value understanding of science above appreciation of science when it comes to science communication. This basically supports the internationally widespread perception of Danish science communication as being dialogue-orientated and engaging, as it emerges from the consensus conferences⁹ (which is also the case in the Danish Science Cafés, see below).

Still, this paper wants to support the concept that it would be highly misleading to consider Danish science communication as being principally involved in promoting dialogue and mutual understanding between scientists and the general public. For example, the agenda of the Danish Government is somewhat different in the sense that the Government's interest in science communication is mainly to foster public appreciation of science by promoting science itself, in order to provide a better platform for public funding of science and in order to boost Denmark's competitiveness globally. I demonstrate below that Danish science communication is much more varied than what is normally accepted and that it does not fall neatly into categories such as "public understanding of science" and "public appreciation of science".

Objective

My objective with this article is to focus on current science communication and its context in today's Denmark. My starting point is the above-mentioned report by the Ministry's science communication think-tank. In the report, the think-tank positions science communication somewhere between understanding and appreciation of science.¹⁰ The tension between understanding and appreciation forms the basis of my analysis of various examples of current science communication and I emphasise that these initiatives are all somehow positioned between understanding and appreciation. In fact, several of the actual examples make a theme of this tension, which becomes a part of the dynamic in much science communication.

I also analyse the examples in terms of their specific context and the media used. My purpose is to emphasise that although current science communication has a national context – i.e. the University Act and the Ministry of Science's desire for more and better science communication – actual initiatives are influenced just as much by their specific context, which is not necessarily national or regional, but may also be more local or even international in nature.

Method

Apart from the think-tank's final report, I have selected various examples of current science communication in Denmark. The examples have been selected with a view to range and variation. I do not claim that these examples are representative of Danish science communication. If there is a special Danish or Nordic science communication model, identification and analysis of it are beyond the scope of this analysis.¹¹

My method is qualitative and only uses the above-mentioned parameters – understanding vs. appreciation, context and media – as a broad guideline for the analysis. In addition, I will analyse the above-mentioned examples in terms of their definition of science and good science communication. The method has been chosen in order to introduce these examples and give the reader an initial impression of current science communication in Denmark.

Results

The think-tank report and recommendations: understanding/appreciation through dialogue

The think-tank was established by the Danish Minister for Science, Helge Sander, in May 2003, when the new University Act was announced. Its mandate was partly to provide an analysis of current science communication in Denmark, partly to propose and test new approaches to better science communication. The think-tank was broadly constituted with representatives from media, culture, industry, research and teaching.¹²

The think-tank's two main messages are: 1) that science communication should be based on a dialogue between science and the public, and 2) that considerable resources must be allocated to science communication. According to the think-tank report, science communication is necessary as an active link between science and society in order to ensure that citizens understand scientific results and working processes, but also to make sure that they appreciate science and science's major contributions to social development. In other words, the think-tank regards understanding and appreciation of science as two sides of the same coin – i.e. good science communication in a techno-scientific and democratic society.

The basis of the think-tank's work is national by virtue of the new University Act and the challenges it presents for Danish universities. However, in its work the think-tank was equally focused on international initiatives. For instance, the think-tank bases its conclusions concerning more and better science communication on the recognition that Denmark lags behind other countries in this respect. At the same time, the think-tank refers to the Eurobarometer 2002 research, which shows that Danes are more interested in science than the EU average. This causes the think-tank to state that science communication is an international matter, in which Denmark should be more involved. In other words, the creation of understanding and appreciation of science in Denmark happens as much in an international context as in a national and regional context.

Despite the international anchoring, the think-tank's work will naturally primarily be reflected in a Danish context. At least three of the many recommendations for more and better science communications – a total of nineteen – have been put into practice. They are the establishment of a special working group for science communication targeted at children and young people,¹³ the creation of an annual prize for good science communication and the organisation of a national Research Day.¹⁴

One of the more controversial think-tank recommendations is that two per cent of all research grants should be allocated to research communication. This recommendation comes from a report prepared by the Danish Centre for Studies in Research and Research Policy and commissioned by the think-tank.¹⁵ Here the international context is again obvious, as the recommendation is made on the basis of an analysis of science communication initiatives in Holland and Great Britain respectively. Both are highlighted as pioneering countries with regard to science communication, and the two authors of the report emphasise that this has only come about as a result of targeted and significant investment in science communication. The conclusion is that if Denmark wants the same level of (good) science communication, the country's government must lead the way and earmark funds for science communication.

Understanding/appreciation through science journalism

While the think-tank did not see any conflict between understanding and appreciation of science respectively within science communication, the tension between the two types of science perception is more obvious within current Danish science journalism.

Today, science journalism in Denmark accommodates many different actors. Looking at the members list of the Association of Danish Science Journalists, we see that only a few are employed by the major, national media, while most of the others work either on a freelance basis or in scientific institutions.¹⁶ The member's survey conducted by the association shows that 80% of them comes from a university background while another 40% has journalistic training or supplementary training.¹⁷

Science journalism is a niche within Danish journalism.¹⁸ Three major national newspapers (and two tabloids) dominate the printed news media in Denmark. Only one, *Politiken*, employs a science editor while the two others basically cover science as part of their regular news coverage and entertainment

sections. Between the major electronic media, only the Danish Broadcasting Service includes programs explicitly on science and technology in its range of programs. This means that media researchers and others have not taken an interest in science journalism until recently.¹⁹

Internationally, there is an extensive literature on science and the media.²⁰ Such studies generally criticize the so-called dominant model, according to which communicating science in the media is only one-way and science-centered. In a somewhat different but still comparable context, Stephen Hilgartner, for example, points out that the dominant discourse has political overtones and often stems from the cultural authority and legitimization of the sciences.²¹ It is an open question today whether journalists and communicators are strong enough to challenge this authority, in order to make science journalism based on journalistic standards and not scientific ones. Whether science journalism really results in more public understanding of science or more public appreciation of science also remains undetermined.

The current debate on science journalism in Denmark was launched in 2004 by the self-taught science journalist Gitte Meyer. In her PhD thesis Meyer criticises Danish science journalists for being servile in relation to science and scientists.²² As a result, according to Meyer, Danish science journalism is degenerating into pure PR for the sciences. In other words, Meyer alleges that Danish science journalists do not undertake good, critical journalism as other journalists do and therefore only produce public appreciation of science. Because journalists – like all other non-scientists – have far too much respect for science and scientific knowledge production, they are unable to apply what Meyer calls “public sense” in relation to the sciences.

In a comment, one of Denmark’s most active science journalists, Lone Frank, who works for the Danish weekly *Weekendavisen*, turns Meyer’s journalistic analysis on its head.²³ According to Frank, it is not science journalism which is on the wrong track, but on the contrary other kinds of so-called critical journalism. Frank claims that what Meyer identifies as good critical journalism actually conceals journalists’ superficial attitudes towards subjects which they either do not understand or are unable to explain to their readers. In Frank’s opinion, there is simply too little knowledge and too much attitude in Meyer’s “critical” journalism.

The kind of science journalism practised by Frank herself thus possibly represents a new departure within critical journalism. In Frank’s opinion, it is important to inform the readers about the substance of the scientific subjects, including associated social and political issues. This enables the readers to understand and be critical of science and technology themselves. Frank’s take on critical science journalism is highly democratic and, in my opinion, substance-critical, leaving the general social critique of science and its impact on society to the readers themselves.

The debate between Meyer and Frank illustrates a science journalistic dilemma which implies that science journalism may have either understanding or appreciation of science as its objective. Often both elements are covered in the same piece of science journalism. At the same time, it is worth noting that the difference between understanding and appreciation of science is used as an ideological tool in the battle about the science journalistic agenda. Thus Meyer uses the term appreciation of science in a patronising way to reject certain kinds of science journalism in favour of others. Frank, on the other hand, completely avoids discussing understanding vs. appreciation of science, but uses another distinction, substantial vs. superficial journalism, as an argumentation tool.

The debate just mentioned is probably a Danish phenomenon and closely associated with the development of science journalism in Denmark, where science journalists and analytical initiatives within science journalism have been few and far between. Nonetheless, the science journalism debate does not take place only in the national arena. Lone Frank is well-known for her many journalistic and scientific contacts all over the world and writes as much about international science as about science in Denmark. Similarly, Gitte Meyer has an international orientation and takes, in her criticism, the most critical part of the international field of research known as Science and Technology Studies as an analytical point of departure.²⁴ The positions of the two science journalists must therefore also be seen in relation to these international networks and the topical issues within these.

Hazard Cards: Understanding/appreciation through games

Science journalism is characterised by a reasonably serious approach to science communication and to the relationship between understanding and appreciation of science. A quite different new initiative

called *Hazard Cards* attempts to integrate play, games and deep seriousness into current science communication in Denmark.

Hazard Cards have been developed by the organisation *Learning Lab Denmark*, which was established by the Danish government and undertakes practice-oriented research in learning.²⁵ *Hazard Cards* are a set of playing cards which instead of cars, aeroplanes or other technologies depict technological disasters (the game can also be played online). *Hazard Cards* players are thus not comparing horsepower or speed, but the number of fatalities, the extent of the disaster, media effect, fear factor, etc....

Although the game may seem rather macabre, the objective of *Hazard Cards* is worthwhile. The purpose is to make the players understand and appreciate the complexity of major technological systems and the risks involved in the use of any kind of technology. Thus the game is intended to inspire reflections about the important role and great spread of technology in today's society. In addition, the game, which may seem provocative, is intended to create debate around acceptable risk in connection with the development and exploitation of technology.

On the website, *Hazard Cards* is described as a science communication project combining research with art and games. However, *Hazard Cards* do not constitute science communication in the sense of communication of scientific knowledge and research. Rather the cards serve to communicate research results based on a broad range of psychological, sociological and economic theories about technology, people, organisation and risk, such as Psychometrics, Qualitative Risk Assessment and Normal Accident Theory. All nine theories and the nine types of technology included on the playing cards are presented on the website. Here players and users can read more about the scientific background of the cards and be introduced to different technology studies and their perspective on science, technology and society.

In other words, *Hazard Cards* aim for understanding of science and technology through appreciation of science and technology studies. In addition, *Hazard Cards* have an explicit normative objective, as explained in an article about the project by the two developers of *Hazard Cards*, Robin Engelhardt and Julie Ekner Koch.²⁶ The normative aspect of the cards consists in the suggestion that it should be possible to reduce technologies with both a high hazard value and a high fear factor to a minimum in democratic societies. The high fear factor will produce a high degree of democratic distaste for the technology and in combination with the high hazard value which ought to have an impact at the expert level and in political life this means that the use of such technologies should be limited or at least controlled. This applies for instance to nuclear energy, which is considered undesirable in many countries and which is under strict public control in the countries exploiting nuclear energy.

Consensus conferences: Understanding/appreciation through involvement and in-depth study

A kind of science communication very similar to *Hazard Cards* with regard to subject and purpose (but not method) is the Danish consensus conferences.²⁷ As with *Hazard Cards*, it is debatable whether consensus conferences constitute science communication in the normal sense. However, it may be argued that consensus conferences involve both experts from various sciences and communication specialists, who together communicate knowledge to a broad panel of citizens. Thus these citizens receive information about the subject of the consensus conference from different sources. The purpose of the conferences is to inspire the citizens to discuss and form an opinion about selected issues associated with the subject. In a sense, consensus conferences thus are a form of science communication and they are included here to give an impression of the breadth of current Danish science communication.

The Danish consensus conference starts out selecting a theme with topical social relevance and one that requires specialist knowledge. Subjects considered so far include "genetically modified food", "the future of the fishing industry", "genetic therapy" and "electronic surveillance". As even this incomplete list suggests, science and scientific expertise are important and central elements in the consensus conferences.

An actual consensus conference consists of two preparatory weekends, where the citizen panel learns about the subject, and four conference days, where the citizen panel questions the experts and invited politicians and debates internally. Thus the citizens are given a unique opportunity to study a techno-scientific subject in depth. The conference results in a consensus document, where the citizen panel in collaboration with its process consultant formulates the relevant issues and its views on them.

As this brief outline indicates, the consensus conference is a complex and varied process. The conferences have many objectives. First of all, it results in a final document showing a number of citizens' assessment of certain technologies and associated problems. Secondly, the process itself enables citizens, experts and politicians to speak with and influence each other. A final purpose is to create public awareness of the selected technological issues. In other words, consensus conferences are not merely a framework for internal communication about science and technology between the participants, but also a tool to create more and better science communication in the media.

Consensus conferences are a Danish invention and originate in The Danish Board of Technology and the Danish tradition of active citizen participation and involvement in social issues. The consensus conferences held so far also tend to have a national focus in terms of issues and solution models, although the subjects are of course almost always international. Since the first consensus conference in 1987, the concept has been exported to numerous countries all over the world. In spite of problems with introducing the Danish consensus conference model to Austria,²⁸ the consensus conferences demonstrate how a particular form of science communication which as a starting point is closely linked to a local context and national culture can become an international phenomenon.

The Danish Science Cafés: Understanding/appreciation through discussion and inter-/trans-disciplinary exchange

The final example of current Danish science communication to be presented and discussed here are the Science Cafés in Aarhus and Copenhagen respectively.²⁹ Of course, the Science Cafés also have international roots like many of the other science communication initiatives being presented in this paper, and today they are found in many countries all over the world. Nonetheless, the science café concept takes a slightly different form in Denmark than elsewhere and – like the consensus conferences – the Danish concepts has spread from Denmark to other countries, though not to the same extent. In addition to the two Danish Cafés, there is today a quite similar Science Café in Houston, USA, which incidentally was started by one of the originators of the Science Café in Copenhagen.³⁰

Most science cafés are intended to create engaged debate around science and technology and they all use the informal café space as the basis of such a debate.³¹ The idea is that the café space may help foster dialogue and discussion by bridging the gap between experts and laymen – at least at the social level. In the café, people are social equals. Both laymen and experts come to enjoy a cup of coffee or other refreshments and only afterwards start talking.

That is the principle. In practice, many science cafés nonetheless experience a relatively clear distinction between the experts, who start by giving a lecture or short presentation, and the café audience, who have come to learn something. To avoid that this gap becomes too large and directly damaging to the dialogue, many science cafés use a moderator or chairman to ensure that the audience is involved and engaged in the dialogue alongside the experts. The moderator in some ways corresponds to the process consultant at the consensus conferences.

As mentioned above, the Danish Science Cafés are based on roughly similar principles. What distinguishes them from the science cafés found in other countries is that they, as a starting point, do not consider purely specialist issues based on the subject of individual disciplines. On the contrary, the Danish Science Cafés are explicitly inter- and trans-disciplinary both in terms of the subjects discussed and the invited presenters. This approach helps to ensure that the café discussion does not take the form of specific knowledge being communicated by scientists to laymen. The inter- and trans-disciplinary elements create a basic uncertainty about who is an expert in relation to the subject discussed, as none of the individual presenters can be said to be expert on issues cutting across their own discipline.

Let me provide a few examples from the Science Café in Aarhus where subjects such as “life”, “intelligence” and “time” have been introduced. The “life” café involved a theologian, an astro-biologist and a bio-philosopher. They each had their own approach to the subject and of course the discussion focused on different definitions of life, but also basic problems associated with defining and studying life. The “intelligence” café brought together a psychologist researching human intelligence, a computer scientist working on artificial intelligence and a representative of Mensa, the association for highly intelligent people. In this way, the café covered two different scientific approaches to the subject, but also a more personal one, which contributed to a broad and nuanced discussion. Similarly, the “time”

café involved a physicist and a writer, who each provided a personal perspective on time. Thus the audience of the café got two very different perceptions of time and it was clear that the scientific view of time cannot stand alone. The writer was able to challenge the physicist and thus also create space for reflections on time as more than a purely physical concept from the café audience.

The starting point for the Science Café in Copenhagen is the same, but nonetheless the café events there have slightly different nuances. In Copenhagen, the subjects of the science cafés are more specific and less philosophical. They have arranged cafés about for instance “doping”, “space elevators”, “The Grid – the web’s big brother” and “the human body and its limits”. As is evident, the subjects cut across traditional dividing lines between disciplines and involve scientists, engineers, politicians and artists.

The Danish Science Cafés thus try to create understanding and appreciation of science through inter- and trans-disciplinary dialogue and discussion. Unlike many other kinds of science communication, often aimed at understanding and appreciation of particular scientific disciplines and particular types of scientific approach (such as natural sciences), the objective of the Danish Science Cafés is to create understanding and appreciation of many different sciences and their ability to create innovation and insight across dividing lines between disciplines and across the socio-intellectual division between science and society.

The Danish Science Cafés are organised in such a way that it is never the scientific methods and results in themselves which are important to the science communication taking place. Rather it is the broader social context of the scientific knowledge production which is of interest to the Science Cafés and – in particular – the wider social and cultural consequences which the sciences contribute to creating.

Conclusions

The above review supports the conclusion that (Danish) science communication is indeed a very varied field. Moreover, it clearly shows that there are many different ways of seeking public understanding and appreciation of science and also, that understanding and appreciation are sometimes difficult to separate in specific fields of science communication. In some cases such as for example science journalism, we might say that the very distinction between understanding and appreciation is actually one of the driving forces. In addition, it is one of this paper’s conclusions that it is not always enough to involve national or regional contexts in order to understand and analyse science communication. In many, if not most cases, science communication transgresses national borders in terms of organisation and objectives.

The trans-national aspects mean that Danish science communication is not only a national phenomenon but has also international significance. This applies even to the Danish Government’s science communication policy enforced in order to strengthen national level of education and to raise public support of national funding of science. Here we also find significant international connections and parallels. Consequently, it is necessary to supplement the current focus on national contexts of science communication with an international view. Danish science communication, for example, becomes quite incomprehensible without the international context, just as current science communication in Denmark might ought to be included in other studies of (inter)national science communication.

In spite of the most obvious and context-dependent relations between national and international levels of science communication, there are a number of elements that apply specifically to the description and understanding of the Danish science communication system. The four science communication initiatives studied above – Danish science journalism, *Hazard Cards*, consensus conferences and the Danish Science Cafés – all spring from particularly national and, in some instances, local circumstances which are fundamental to achieving a full understanding of such initiatives. In this paper I have attempted a first empirical analysis of these national and local circumstances which is necessary in order to understand the significance and application of Danish science communication in other contexts.

As it happens in other countries, in the Danish science communication system there is a growing awareness of the importance of two-ways communication between scientists and citizens. This is found in the report of the think-tank, in the new University Act, and in specific initiatives such as the Danish Science Cafés and the consensus conferences. In Denmark, the wish to communicate science by engaging the public in dialogue and debate is often motivated by referring to the Danish culture of public democracy and active citizenship. However, since the same wish can be found in many other countries it

is by no means clear that this tradition is a necessary and even sufficient condition for introducing more dialogue in science communication in Denmark and elsewhere. Conversely, the growing internationalization of science communication and the increasing number of studies of national systems of science communication will probably result in the decreasing importance of specific national cultures on Danish science communication and science communication in other countries.

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- ²⁷ Consensus conferences are developed and run by the Danish Boards of Technology; available at: <<http://www.tekno.dk/subpage.php3?article=468&toppic=kategori12&language=uk>> (retrieved Sept 7, 2005). A description of how the conferences were organised in 2003 is available at: <<http://www.co-intelligence.org/P-ConsensusConference1.html>> (retrieved Sept 7, 2005). See also: J. Grundahl, "The Danish Consensus Conference Model". In: S. Joss, J. Durant (eds.), *Public Participation in Science. The Role of Consensus Conferences*, Science Museum, London, 1995.
- ²⁸ U. Felt (ed.), "O.P.U.S. Optimizing Public Understanding of Science and Technology. Final Report", cit., s. 650.
- ²⁹ Although the Science Cafés take place in two different cities, they are based on the same concept and have a joint website, available at: <<http://vcaf.dk>> (in Danish only, retrieved Sept 8, 2005).
- ³⁰ Available at: <<http://www.sciencecafe.net/>>
- ³¹ See e.g. the websites of the English Café Scientifique, the French Bar des Sciences and the Italian Caffè-scienza, available at: <<http://www.cafescientifique.org/>>, <<http://bardessciences.net/>> and <<http://www.caffescienza.it/>>

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