

How do news media best contribute to scientific literacy?

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Abstract

The last five years has seen a significant increase in the amount of resources and manpower put into science communication in Europe. The current focus on science and innovation as a pivotal part of the Lisbon Strategy/Barcelona Goals in the EU has strengthened this development. In Denmark this has been enhanced even further by a government policy stressing better science communication as a prerequisite for better science funding. In other words: if scientists want better public funding, they have to convince the public that the money will be well spent. This is seen for example in the new university law that stresses the obligation of scientists to communicate their work to a broad audience. Recently a study of 1200 Danish researchers showed that they see the news media (newspapers, television, radio) as the best way of

communicating their work to a broad audience. The study reflects a strong sentiment in the Danish research community, that news media should share the strategic goals of scientists and the government to encourage people and especially young people to take a keener interest in science. My point however is that the news media cannot do that. Our role as responsible media is to question these priorities, not to be a part of a publicity campaign for science.

This will lead me to a general discussion on the importance of the news media doing proper science journalism instead of science communication. In an analogy to the political debate, science communication can be equated to political spin doctoring. Science journalism takes the role of proper political journalism. And just as critical political journalism is better at raising political literacy than spin doctoring, so is proper, critical science journalism the best way to raise scientific literacy. Using examples from Politiken I would like to try and define what distinguishes science journalism from science communication.

Keywords: Science communication, Science literacy

Science is at the very forefront of development. Not only because science in its nature constitutes a lot of what most people would consider human development incarnate. The development of new technologies has enabled us to explore further, live longer and be happier (perhaps) than ever before.

In these years science as such, the pursuit of new knowledge as a livelihood, is also moving out of the relative obscurity where it has been living quite well for most of the 20th century, into the full spotlight of the political arena. Science and the pursuit of the best scientists has become a prime objective for governments all over the globe. This may sound a little too obvious to be of real interest, but the point made in this paper is that this development is actually so new, at least in the European Union and Denmark, that most mass media haven't gotten used to dealing with science in the right way.

Science as the driver of growth

The European Union provides a good example of how science is moving from being seen as a "cog in the wheel" in a larger machinery designed to further growth and prosperity, to becoming the driving engine of this machine.

In 2001 the EU heads of state and governments adopted the Lisbon Strategy. The best known phrase from this is probably the desire to transform the EU to "the most competitive and dynamic knowledge-driven economy by 2010".

There is a lot of 1990's "knowledge economy" hype in this phrase, and initially fra 2000 to 2004 science as such didn't play a important role in the plans for creating the European Knowledge Economy.

As in much of the 1990's the "strengthening the knowledge economy" in the original Lisbon Strategy (from 2000 to 2004) usually meant strengthening the telecommunications networks, strengthening innovation (usually demand-driven, not science driven) and a host of more traditional economic tools for creating growth: trying to create more flexible labour markets, making it easier to set up new businesses. Science wasn't totally absent. But it was a lesser part of what was to make the European Union's economy grow faster.

The Lisbon Strategy of 2000 also put strong emphasis on the social and environmental development of Europe to 2010. These parts were seen as integral to the economic development and thought to actually boost economic growth, not hinder it.

In 2002 the Lisbon Strategy was supplemented by the Barcelona Objectives putting actual figures to the European Union's ambitions on science: in 2010 3 % of GDP should be used on research. 2 % should come from private investment.

In 2004 the Dutch premier Wim Kok headed the work to rewrite the Lisbon Strategy. The European Commission later chose to declare that the part of the strategy concerned with social and environmental sustainability was no longer high priority, and that further work should emphasize the economic development.

Parallel with this there was a process running to set up a European Research Council (ERC). The EU has been sponsoring R&D through the Framework Programs since 1984. These programs have however often been criticized for putting too much emphasis on applied research in contrast to basic research. The criticism often focuses on the need for Europe to commit more funds to research driven by scientists and their ideas (aka bottom up) not by politically appointed areas of interest (aka top down). In November 2002 the then Danish presidency of the EU set up an expert group to explore the options for an ERC that would focus on bottom up research.

Last year the expert group's recommendations for setting up an ERC were largely adopted by the European Commission. The Commission also suggested doubling the part of EU budget that goes to R&D from 4.5 % to 9 %, but in the heated debate over the EU budget the Commission's proposed raise was cut down considerably.

In terms of actual funding science may not have gained much ground in the EU, but the development especially during the last year, has shown that strong forces in the Commission and in some member countries wish to strengthen science as a means of pushing economic growth. The most recent example of this is the proposal from early this year to create a European counterpart to Massachusetts Institute of Technology the 'European Institute of Technology' that was put forward by the Commission.

And - perhaps most notably - basic research has been accepted within the EU as a necessity for economic growth, though they have conveniently renamed it 'frontline' research.

In the EU member countries as a whole, science has not fared much better, when you look at the raw numbers. The latest figures (from 2003) show that the EU member countries as a whole spent 1.93 % of their GDP on research. The United States spent 2.59 % and Japan spent 3.15 %. But the figures themselves are not the whole story. Science has been placed on the political agenda in many member countries, often because of lack of funding.

From "publish or perish" to "reach out or cut back"

In the case of Denmark the discussion on better funding for science has been closely tied to how good scientists are at communicating their work to not just colleagues and business partners but also to the general public.

In the spring of 2003 the minister for science, technology and development, Helge Sander, described the situation quite clearly at the yearly meeting of Forskningsforum (the head body in the Danish system of research councils):

"Outside this room, you [the scientists] are seen as touchy and spoiled people, that always demand more money. I have strong misgivings about the tendency to just demand more money. We probably agree, that we would like more money for research and development. Not for science's sake, but for society. But if we want that, we all have to put in an effort to convince people outside this room that it is a good idea. And you have to help." (Politiken. 25. Feb. 2003, own translation).

The following revision of the Danish laws for universities (Lov om universiteter, Lov nr. 403 af 28. maj 2003) underlined the need for university employed researchers to communicate their work to a broader audience. § 2 describes the purpose of universities, and in this context subsection 3 is most interesting. It says: "The university has to... broaden the knowledge of the results and methods of science," and: "The university must as a central knowledge and culture bearing institution exchange knowledge and qualifications with the surrounding society, and encourage the members of staff to participate in the public debate." (own translation).

This has in the Danish debate been labeled "the universities' obligation to communicate".

The new university law left most of the universities in some trouble. They (and especially the scientific staff) weren't (and aren't) used to communicating to a broader audience. They had problems defining how to credit a scientist that spends time talking to media instead of writing scientific articles. And they were (and are) anxious about keeping their credibility when entering into a tighter relationship with mass media.

Still, from my post as scientific editor I feel that the minister's words are beginning to take effect. The Danish Universities have in the last couple of years adopted a much more forthcoming stance towards journalists and are becoming much more aggressive in their efforts to place their stories in the news media. Most of the universities in Denmark have hired more communication consultants or made arrangements with out-of house media consulting firms to promote their work to the media. There have been a lot of internal discussions on new media strategies - I have been involved in quite a few - and there is even some progress on the discussion on how to merit communicating science to 'the masses'.

News media are by no means the only channel for scientists to communicate their work to a broader audience. Shortly after the aforementioned meeting in Forskningsforum in 2003 the Ministry for Science, Technology and Development established a 'Think tank regarding the understanding of science'. Their report (from May 2004) has a range of recommendations on how to strengthen the communications from scientists to laymen. Nevertheless a report from the Steno Institute at the University of Aarhus published in October 2005 shows that Danish scientists regard the news media as the most important media for the universities to fulfill their obligation to communicate.

The press release from the institute stressed that "The ivory tower has fallen", and that the vast majority of Danish scientists are now ready to come out and face the news media.

That leaves the big question. Are the media ready to meet the scientists?

Not ally nor enemy

The study from the Steno Institute underlines the experience from working with science journalism at Politiken newspaper for close to three and a half years. Scientists and research institutions have indeed become much more focused on communicating their work to the news media.

A few words on the Danish media are needed here: Denmark has three large national newspapers, each claiming to be the leading Danish newspaper. What is indisputable though is that Politiken is very much the newspaper for people with a high degree of education, for teachers, university staff, politicians and everyone else who could reasonably be believed to have a higher interest in science, than people as such.

About 25 % of our approx. half a million readers are employed in the public sector and their best job description is teaching. In this light it is not strange that Politiken also has the most focus on covering science with a special weekly science section. Therefore we have for many scientists become the prime target for their efforts to get into the news media. And that's why we have to turn so many of them down.

There are a few good reasons for this. First of all, we don't have enough paper to write about every scientist or communication consultant that calls us. Far from it. Second, we don't give preference to Danish research.

The latter reason is most interesting in this context. Quite a few people have become offended when we turned their story down for a story about a breakthrough made by foreign scientists.

The study from Steno Institute in my opinion reflects a strong sentiment in the Danish research community, that news media should share the strategic goals of scientists and the government to encourage people and especially young people to take a keener interest in science.

Very often they will try to argue their story into the newspaper with the reason that, "the ministry says we have to communicate more. How can we do that, if you won't cooperate?" We have even had an instance when a scientist would pay what amounts to about 1,500 dollars for us to do a story on his work. He didn't intentionally try to bribe us. He just didn't see the problem. He had gotten this amount of money to do publicity for his work, and he was trying to spend it. If a politician did the same - trying to pay a newspaper for publishing an article on his views - probably both he and the newspaper would know that they would be venturing on to very thin ice indeed. But even though there has been only this one incident of offered payment, there still is a feeling from many (not all) scientists, that we in the media "just aren't helping enough" in the effort to make people more interested in science and thus - hopefully - attracting more money and more students to science.

My point however is that the news media cannot do that. Our role as responsible media is to question these priorities, not to be a part of a publicity campaign for science. An area with such an amount of political tension and so large an influence on the economic development should be covered by newspapers and other serious mass media with their full attention. This means you should use all the tools from journalism: critical investigative journalism, portraits of the people behind the decision or breakthroughs, on-the-spot reporting, etc. to cover this important topic as best possible.

More than gorillas and robots

So how are we doing in the news media right now? On this I can only speak from a Danish point of view. We are reasonably good at the political level. Every so often we write about how the government isn't upholding their part of the deal: even though the scientific community indeed have put in an effort to communicate their work to a broader audience, Danish public spending on research and development hasn't increased since 2003. The government still adheres to the Barcelona Objectives, at least that's what they say. But as each state budget passes without significant increase in public spending on R&D, this seems more and more far fetched.

We do however - at least in Denmark - tend to be a bit biased in our coverage of the public spending on R&D. While it is always good for newspapers to point out when governments don't stick to their word, in this case I feel we need to raise the question of whether or not more spending on public R&D is actually the best way to spend more public money. I think we need more stories that analyze how financially sound further investment in R&D is compared to further paying off of public debt, compared to better health care or better use of preventive measures in health care. Many will be aware of the discussion right now in Denmark on how to better integrate the immigrant minorities, especially from the Middle East. I have yet to see journalists trying to compare the benefits of more R&D to the benefits of better integration. In other words: science as such is getting an easy ride in the Danish media at this time.

We are also reasonably good at reporting on and analyzing the developments in the education sector including the discussion on globalization of the labor market for scientists and the struggle between countries to attract the best minds.

All that is politics, and we cover it with the full set of journalistic tools that we have available.

Where we are not very good is in covering science itself.

Science stories are most often regarded as comic relief from the daily bombardment of bad news that news editors feel obliged to put in the papers. That is why a story about robots or monkeys is always easy to get past a news editor, many of whom later complain about the fact that this particular robot was a small box with wheels and didn't look like anything out of Star Wars.

A lot of other stories about scientific results or discussions are actually being done, but the coverage of new scientific breakthroughs suffers from the fact that 90 percent of these stories are done the same way:

A short presentation of the result, some comments from experts not attached to the study being reported on (if possible), and maybe a comment that draws up some of the perspectives of this new result.

In itself this is not a bad way to do an article, and I must admit, that at Politiken we do quite a few after this fashion.

The problem is that these kinds of story much too often stand alone in the news media. This kind of article is more or less pure science communication - telling a broader audience about some new result or sometimes a series of results. It is not very good science journalism as it - when it stands alone - leaves the readers/viewers somewhat lost in many cases.

Why better journalism?

First of all, this kind of science communication is prone to exaggeration. Exaggeration of the importance of the result or of the perspectives of it.

One example from Politiken is our coverage of the so called 'hydrogen pill'.

At the beginning of September the Danish media (and I regret to say Politiken more than any) started a large hype about a new pill made of ammonia and hydrogen. The pill supposedly would be the solution to the problem of storing hydrogen in cars. The ammonia-hydrogen pill thus would be the starting point of the true hydrogen revolution in personal transport. At least that was the impression that was given in the first two days of coverage.

I - luckily for me - was out of town at the time, but when I returned I didn't really see any problem with our coverage.

We had the scientist behind the pill, we had comments from one of the peer reviewers, who at the time was one of the few people who had actually read the paper in question. And we had comments from industry saying that this could be the start of a great industrial adventure for Denmark. On the surface everything looked fine, and the wheels were already beginning to turn with political demands for more funding for the group of scientists behind the pill.

The next week though I decided to do a followup story, and contacted the people in Denmark who I from previous experience knew worked in the field. Quite rapidly I realized that we had at best told only a part of the story about the hydrogen pill.

First of all, the idea of storing hydrogen with ammonia is not new. It has been proposed many times before, but has always been ruled out because the extraction of hydrogen from the ammonia takes too large a part of the energy stored in the hydrogen to make it a smart way of 'tanking hydrogen'. The researchers claimed that they had new techniques to extract the hydrogen, but nothing in the paper indicated a revolution there. Secondly there was the question of whether or not they had actually made anything new. Apparently Siemens hold a patent that is uncomfortably close to the work being done by the people behind the hydrogen pill. Thirdly our previous work on the hydrogen pill didn't try to compare it to other hydrogen storage technologies, which are making quite significant progress.

The follow up article turned out to be a rather large and critical piece on how the hydrogen pill might be mostly bluff. I believe this was a much better piece of work because it put the hydrogen pill into the right context.

Why did we do so badly the first day? My answer would be because we forgot our basic journalistic instincts. First it needs to be said, that the university where the pill was developed itself contributed quite generously to the hype. The press release (sanctioned by the scientists) stated, that this would be the invention that would make "civilisation independent of fossil fuels". This kind of claim should make journalists very sceptical indeed. But it didn't. I later asked around, and the reaction from the people working with the story was mostly: Well, DTU (Technical University of Denmark, where the pill was developed) wrote it themselves, so it must be true. Press releases from political parties or companies tend to be read by journalists with a large portion of scepticism. But coming from a renowned Danish university the press release got a free ride.

Secondly we didn't use the time needed to contact the scientists in Denmark who were working in the area. We had a lot of comments from colleagues of the scientists behind the pill. But lack of knowledge of the area resulted in a (first day) coverage, where the best Danish sources were absent. In most areas of journalism, you get a chilly feeling down your back when all your sources agree. The reaction should be: "Have we missed something?" and you should put in an extra effort to make sure that you haven't overlooked important voices.

Thirdly we were not first in the journalists' food chain. I believe the BBC had the story before us, and that normally results in standards being lowered. "If it's on the BBC, it's probably OK, so we won't have to check it again". I haven't studied the BBC's coverage of the hydrogen pill, so I won't comment on that, but I think it is safe to say, that we shouldn't let the fact that other journalists write about a topic let us stray from the normal procedures of our work.

The picture that stands after the dust has settled is that Politiken on a critical day brought a very highly profiled (front page and all of page 2) piece of misinformation. And we did so because science wasn't treated according to the same standards as other areas of interest. One aspect of this is the tendency always to regard scientists as impartial expert sources, while in reality in many cases - especially when reporting on science - they should be regarded as stakeholders with strong interests that will probably bias their views.

The second problem of the largely one-facetted science communication is that it gives rise to a lot of confusion. This is true in a lot of areas but I choose to focus on nutrition. In 2005 and 2006 (to 13 March) Politiken has published 313 articles containing the Danish word for nutrition (ernæring). Quite a few of these report on new studies on diet and nutrition, but the picture these articles paint isn't very clear. Potatoes are a big thing in the traditional Danish diet, but I believe very few of our readers today are able to tell if potatoes are good for them or not. I know I am not. So I stick to the diet I'm used to: lots of potatoes.

Of course the confusion is also due to the fact that scientists disagree strongly on nutrition. But as new results keep pouring in it doesn't seem like the confusion will end. My point is that in this case at least (and probably a lot of other cases) more science communication won't heighten the readers' scientific literacy (their ability to read and digest information about science in a way that will enable them to make better or more informed choices). The best way for the news media to do that would be to cut down on the science communication and do more science journalism. One place to start would be to explain how and why carbohydrates have become the battleground of nutrition, so they have a basic understanding of the discussion. This battle of science could also benefit from the use of other journalistic genres as portraits telling us about the people behind the discussions. Or maybe a group of investigative journalists should look into the money being made on nutrition advice. These ideas are not new, I believe I have even seen some of them realized. The problem is that the good science journalism about this subject is drowned out in the mass of science communication about new results being eagerly pushed by Universities and their communication consultants.

The third large problem that science communication isn't very well equipped to deal with is the question of fraud or just badly done scientific work. In Denmark we have had two major cases of this in the last couple of years: Bjørn Lomborg and Anders Pape Møller. Lomborg's book 'The Sceptical Environmentalist' was found to be "clearly contrary to the standards of good scientific practice" by the Danish Committee on Scientific Dishonesty (DCSD). Later DCSD's decision was overruled by the Ministry of Science Technology and Development on the grounds of being too poorly tried.

In the case of Anders Pape Møller, DCSD ruled that he was guilty in fabrication of data. This ruling still stands though Pape Møller has complained.

Both of these cases - but especially Lomborg - have received a fair bit of attention in Danish media. The point I wish to make in this instance is that these cases have been covered quite well, but not by science communicators. As I believe is also true in the case of Dr. Hwang here in Korea it wasn't the regular science reporters that brought the dishonesty to attention. I was present at the meeting where Dr. Hwang presented one of his revolutionary papers in Science. His results were remarkable - too good to be true it later turned out - but at that press meeting at the AAAS yearly meeting, Dr. Hwang faced a group of the best science reporters in the world, and they believed him without doubting.

This is not that uncommon. Political reporters tend to be critical of colleagues trying to expose large political scandals, at least in the beginning. There seems to be some form of "bonding" between sources and journalists in most areas. This is problematic in all areas of journalism but doubly so in science reporting because it - at least in Denmark - is regarded as a bit of a reservation for the eggheads of journalism. So fewer colleagues with fresh views of things will venture into our field of work and help us see the stories we overlook.

The end

Science is an area of growing political and economic importance. There are a growing number of people professionally working as spin doctors for science. At the same time most of the stakeholders agree (at least in words) that science should receive stronger funding. To some extent the stakeholders expect the media to share this goal.

From a traditional journalistic point of view this situation would call for journalists to take their job very serious, using the tools they have to best give their readers an understanding of the subject in matter while trying to navigate around the pitfalls of getting too close to the sources or doing stories with no critical consideration.

Instead science reporting is often reduced to comic (or 'fascinating') fill-in. Many science journalists - in Denmark at least - don't take pride in being distanced from and critical of their sources. On the contrary many seem to think that close cooperation with the sources will make better articles. And most reporting on science is done in very similar ways creating a lot of stories that don't deal with problems such as diverse scientific results and scientific dishonesty well, and tend to exaggerate the importance of scientific breakthroughs.

I believe we are not very good today at strengthening the scientific literacy and more science communication isn't the answer. Better science journalism is. This calls for science journalists and editors to raise their ambitions (and perhaps write fewer stories). In an ideal world this would also call for press service officers and communication consultants at universities to stop pushing new results and start helping doing the in depth stories that actually help readers and viewers understand science.

Links:

The report from the Danish Ministry of Science, Technology and Development's Think tank regarding the understanding of science (in Danish): http://www.videnskabsministeriet.dk/cgi-bin/doc-show.cgi?doc_id=206470&leftmenu=PUBLIKATIONER The report from The Steno Institute, University of Aarhus (in Danish): <http://www.nat.au.dk/default.asp?id=10785&la=DK>