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Philosophy, Science and the Media

Abstract

In the complex interaction between science and the public already at the end of the 19th century, Oton Kučera has seen the important role of philosophy, which counts on the advancement of the natural sciences that has begun with the new understanding of natural processes and phenomena. There is no doubt that the media are the most effective in bringing science closer to the broader publics. Therefore, in this short presentation I will compare the results of the recent Public Understanding of Science *(PUS) surveys dealing with the knowledge about, the expectations from and the attitudes towards science. I will discuss the possible influence of the media with regard to the content and will present some of the models of science communication, as well as the types and characteristics of audiences for science in the lay public. Many important studies have shown that the correlation between knowledge and positive attitudes exists only to a certain point and that the beliefs have an important role in the creation of attitudes and in the decision-making process about sensitive issues or risk. After the analysis of few case studies, my conclusion will be that philosophy can help to improve the science–media–public relationship in its weakest points.*

Key words

philosophy, media, media influence, science communication, astronomy, swine flu

The media influence

When we think about the media influence regarding the content, we usually think about (1) what kind of issues are important in the mass media, and therefore influence the public perception and (2) how they are framed in the media. The first question is a central question of the agenda setting theory, which says that the main message that the media are sending is the message of importance. It is transmitted via salience, and salience is the result of specific placement of an issue in the media (prime time in electronic media, or the front, the last or the middle page in the newspaper; place on the page etc.) and layout (headlines, photographs or illustrations, etc.). So the mass media do not tell us what to think, but what to think about.[1] The media influence is not simple and it depends on what the media are talking or writing about. Political or religious beliefs are firm and the media have almost no influence on them. On the contrary, popular culture, music, fashion, etc., are strongly influenced by the media. Since popular culture is related to some deeper values, like sexuality or race issues, media can indirectly influence them as well.

1 Donald L. Shaw, Maxwell E. McCombs, *The Emergence of American Political Issues: The Agenda-Setting Function of the Press*, West Publishing Co., St. Paul–New York–Los Angeles–San Francisco 1977.

Mass media can influence the way we perceive their content and the world around us through the way they frame issues they report: the context in which they are placed, the prevalence of positive or negative tone, the way in which media professionals select sources and information, what they publish or broadcast and what they do not, and the way they present it.

In a recent study, Brossard et al.[2] highlight some new insights into the media influence with regard to new technologies. They assess the degree to which various levels of religiosity, use of science media, knowledge about technology, and risk and benefit perception influence the perception of nanotechnology. They find a direct and negative relationship between religious beliefs and the funding of nanotechnology. In the early stage of the development, science media had an important role in shaping positive attitudes about technology. It was not a surprise, because the media are the primary source of information about science and technology as it has been showed by Eurobarometer studies (e.g. Special Eurobarometer 282, *Scientific research in the media, European Commission*, December 2007; Special Eurobarometer 224 *Europeans, Science and Technology*, survey and report, European Commission, June 2005) or National Science Foundation Surveys (e.g. National Science Foundation, *Science and Technology: Public Attitudes and Understanding*). Factual knowledge about technology has a role in shaping positive attitudes about nanotechnology.

But Brossard et al. also indicate an interpretative role of religiosity in the perception of nanotechnology, when it interacts with the factual knowledge. Religiosity is "a perceptual filter in the process of opinion formation about nanotechnology".[3] As expected, highly religious people are also notably against the investment in new technologies.

Finally, Brossard et al. find out that the perception of risks or benefits is related to the negative (risk) or positive (benefits) attitudes. Value predispositions such as religiosity, they conclude, can suppress the positive effect of knowledge in forming positive attitudes. With regard to the media, they find the positive relationship between reading on science in the newspaper or watching it on television and support for funding nanotechnology. Their conclusion is that the public support of investing in the new technologies depends not on factual knowledge, but on "more applied heuristics such as risk and benefit perceptions or other media frames".[4] Media frame effect, in terms of potential benefits or risks, can constitute powerful heuristics,[5] especially for issues that are not directly linked with everyday life.

Models of science communication

For the purpose of this paper, I will shortly present some models of science communication and chronology of research in this field which, some researchers presume, is related to those models. So-called "Linear model", as the title says, means that science communication is a linear process in which, after the research has been done, there is the evaluation process including presentation of the results to the scientific community in intra-scientific communication (e.g. talks or lectures, scientific meetings or conferences, etc.) and publishing in scientific journals. Finally, the third and the last stage is the presentation to the general public, mainly through the media. Thus, before the communication to the public, scientific information has to go through all those stages (fig. 1a).[6]

Scientific magazines → Media → Public

Figure 1a: The linear model of science communication

But, there are authors that see many more subjects involved into science communication. For instance, Bruce Lewenstein has developed so-called "Web model" which is presented in the figure 1B.[7] Here the emphasis is on communication, which is a two way process and not only one way as it is implied in the linear model.

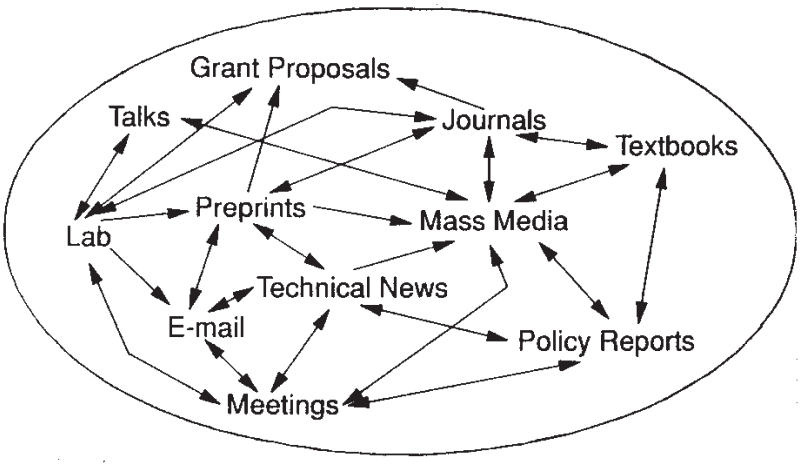

Figure 1b: The web model of science communication

There is another approach, which puts communication in the centre, and says that there are various models of science communication starting from the prevailing monologue and top-down communication, via dialogue to participation of various actors involved in the process.

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Dominique Brossard, Dietram A. Scheufele, Eunkyung Kim, Bruce V. Lewenstein, "Religiosity as a Perceptual Filter: Examining Processes of Opinion Formation about Nanotechnology", *Public Understanding of Science* 18 (5), 2009, pp. 546–558.

3
Ibid., p. 546.

4
Ibid., p. 555.

5
Dietram A. Scheufele, Bruce V. Lewenstein, "The Public and Nanotechnology: How Citizens Make Sense of Emerging Technologies", *Journal of Nanoparticle Research* 7 (6), 2005, pp. 659–667.

6
Blanka Jergović, Mladen Juračić, "Evolucija, smrt, život i dugovječnost: znanost, službe za odnose s javnošću i mediji" ("Evolution, Death, Life and Immortality: Science, Public Relations and the Media"), *Društvena istraživanja* 18 (4–5), 2009, pp. 875–893.

7
Bruce V. Lewenstein, "From Fax to Facts: Communication in the Cold Fusion Saga", *Social Studies of Science* 25 (3), 1995, pp. 403–436.

As shown in Table 1, models of science communication are connected with certain "paradigm", including the way of perceiving public science and certain methods of science communication research. The first period, so-called "Deficit model", started in 1960s. "Dialogue model" was developed in 1985, and "Participation model" in 1990s.[8]

	Communication	**Purpose**	**Accent**	**Ideology**
Deficit	top-down, one time, transfer, popularisation	scientific literacy, education brings positive attitudes	content, factual knowledge	scientism, technocracy, knowledge based economy rhetoric
Dialogue	consultation, two-way, interactive	persuasion, negotiation, consensus	context	social responsibility, culture
Participation	co-production, many-ways, open-ended	persuasion, consensus, cooperation	contact	participation, "citizens", science, democracy

Table 1: Models of science communication

The rhetoric has been changed with time, too. First, science was popularised and we were talking about bringing science closer to the public. Then we moved to "science and the public" and, to show more interaction and genuine communication, to "science in the public". Nevertheless, the change of rhetoric does not necessarily mean the change of meaning.[9] The Dialogue model was criticised because it was developing the serial of monologues. Dialogue means also listening, but this idea was not so present within this model. Therefore, together with public understanding of science, scientific understanding of the public is needed to establish two way communication and involvement.[10]

Nevertheless, the profound and rapid changes in technology have introduced changes in receiving and sharing scientific information. A completely new scene has been set for science communication and so-called "Participation model" has been developed. The time frame of the models is not shown in this table, because it is not fixed and there are overlaps in which the characteristics of two models are present. Also, we have to take into consideration various cultural, educational, political and economical differences influencing science communication in various countries.

In the public communication of science, the very important role of PR agencies or science information officers at scientific institutions has to be emphasized,[11] as well as the role of the most prominent scientific journals such as *Nature* or *Science* as the most used sources of information in European Union, according to the European Commission's Online survey of media editors and journalists (2007).[12]

Audiences for science in the public

To be successful, every communication has to have (a) well selected goal(s) and to be aware of what kind of audiences it has. The audiences for science are the subject of various surveys. In an attempt to learn more about the audiences for science in the public, there are usually three accepted criteria: the knowledge about, the attitudes towards, and the expectations from science and technology. According to their knowledge and attitudes, J. D. Miller (2000)

proposes three broad categories of public. This study is based on the large scale surveys in Europe, United States and Japan: *Attentive public* has high level of factual knowledge and knowledge about scientific methodology and high levels of interest. They also follow media coverage of important issues. They constitute 15% of the public. *Interested public* constitutes about 10% of the total population, they do not feel confident with the basis of knowledge about science and technology, but they show high levels of interest. Also, they regularly follow the media coverage of relevant issues. The vast majority, *Residual public*, occasionally learns about and is occasionally interested in science, and they constitute 75% of population.[13]

The joint report by The British Office of Science and Technology and the Wellcome Trust, *Science and the Public. A Review of Science Communication and Attitudes towards Science in Great Britain*,[14] published also in 2000, makes a more subtle distinction and recognizes six categories of audiences for the science in the public. This report indicates the importance of perception of benefits and risks, which was lately confirmed by Brossard et al. (2009), and the importance of possibility of active citizens' involvement in the decision making process in creating positive attitudes towards and expectations from science, later confirmed by Durant et al.[15]

The first category of audiences, according to this report, is *Full of confidence*, characterized by the positive attitudes and confidence in science. They are middle aged, well educated and have a good socio-economic status. They also trust in politics and believe that they can influence the government in decision-making. They represent 17% of the population. The largest group, *Technophiles*, represent 25% of the general public. They have trust in science, but they do not believe politicians and they need confirmation that regulatory system exists and works, and they are skilled in finding information when they need it. Another 17% of the audiences are *Supporters*. Younger, impressed by science, engineering and technology, confident in their ability to adapt to the

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Martin Bauer, Nick Allum, Steve Miller, "What Can We Learn from 25 Years of PUS Survey Research? Liberating and Expanding the Agenda", *Public Understanding of Science* 16 (1), 2007, pp. 79–95.

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Massimiano Bucchi, *Beyond Technocracy: Science, Politics and Citizens*, Springer, New York 2009.

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Steve Miller, Declan Fahy, "Can Science Communication Workshops Train Scientists for Reflexive Public Engagement?", *Science Communication* 31 (1), 2009, pp. 116–128.

11
E.g. in B. Jergović, M. Juračić, "Evolucija, smrt, život i dugovječnost: znanost, službe za odnose s javnošću i mediji".

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See also Blanka Jergović, "Towards More Responsibility in Communicating Science", in: Michel Claessens (ed.), *Communicating European Research,* Springer, Utrecht, 2007, pp. 187–191.

13
John D. Miller, *The Public Understanding of Science and Technology in the United States: A Report to the National Science Foundation: Science and Technology Indicators*, National Science Foundation, Washington, D.C., 2000.

14
Science and the Public. A Review of Science communication and Attitudes Towards Science in Great Britain, A joint report by The Office of Science and Technology and The Wellcome Trust, The Wellcome Trust Publishing, London 2000.

15
John Durant, Martin Bauer, George Gaskell, Cees Midden, Miltos Liakopoulous, Liesbeth Sholten, "Two Cultures of Public Understanding of Science and Technology in Europe", in: Meinolf Dierkes, Claudia von Glotz, *Between Understanding and Trust: The Public, Science and Technology*, Routledge, Amsterdam 2000, pp. 89–107.

rapid changes, they show interest in biomedical sciences as well, and have trust in the government. The smallest group are *Concerned* – only 13% of the population, mainly women (in this group 60% are women). They show interest in the broad spectrum of issues and are aware of the importance of science, particularly for their children. Their social and educational status represents the average of the society, and they are sceptical towards the government. At the bottom, there are two groups according to the trust in science. *Not sure* are not against, but also not for the science because the benefits it brings are not so evident in their lives. They are poorly educated and socially not secured and they represent another 17% of the population. Finally, there are those who are not so interested in politics and science, but appreciate their meaning for the younger generations; *Not-for-me* are older than 65 and represent 15% of the population. Without any doubt, PUS surveys are offering us valuable information about the audiences for science in the public.[16]

Nevertheless, some authors are underlying that in contact with citizens, science is much more complex that it can be concluded from the quantitative or PUS studies.[17] Science is not homogeneous and it cannot offer enough reliable answers to the questions from our everyday life.[18] As shown by Falchetti et al., the interest detected in the PUS studies can be broader and more demanding, particularly when it is connected to the actions and decision making in real life, when we need knowledge which is easy to understand and ready to use. This study differentiates (1) those who ask scientific information to resolve a task (e.g. students); (2) those who need the information when they need to solve a problem from everyday life, make career choices etc; and (3) those who seek information for intellectual pleasure.[19] In the first case, which is also the most usual, the easily applicable information is needed. But the situation when we need information to make a decision or for intellectual pleasure, presume trust and confidence that science is valuable and powerful.[20] In situations like that, citizens use Internet,[21] particularly younger and more educated, and they prefer interactive sites.[22] It is evident that this is not in accordance to what traditional education or media is offering. There are on-line editions of newspapers where audience can make comments, but this is not comparable to the active search for scientific information, and is useful mainly as a feedback to the media or can be interesting to the media theoreticians. Active search for knowledge can reveal more about the citizen's real need for information and expectations from science, and it also includes the need to understand and know about the process of the scientific production, evaluation and validation of information.[23]

To conclude, in order to tailor our communication so that it fulfils our intentions and meets the needs of our audiences, it is recommended to gather as much information about the audiences as we can. For science in the public, according to Brossard et al., communication has to be designed taking into account the characteristics of the public. Science in the public, therefore, can be influenced by the mass media as the most common source for scientific information, together with other factors like education, levels of information, beliefs systems and risk/benefit perception.[24]

Few examples of media–philosophy relation

1. 40th anniversary of the first man landing on the Moon

About 50 years ago, in times of the Cold War, just after the Panama Canal has been built, America needed a new push. That was a time of the charismatic leader John F. Kennedy, who had a firm political will to send a man crew to

the Moon. That was a very ambitious plan, but within few years all technical problems were solved and Apollo 11 landed on the Moon on the 21th of July 1969. There were three astronauts on board; Neil Armstrong, Edwin Aldrin and Michael Collins. It was a great achievement of mankind, new American primacy, unbelievable scientific accomplishment from which we have learned that there is no life or liquid water on the Moon, and that it is approximately the same age as the Earth. The expedition to the Moon offered us a new look at the Earth as well; for the first time we saw it from a totally new perspective. It was also a great benefit for the science and people's life. In the Apollo 11 program the search for the new sources of energy has been started, and SWC (Solar Wind Collector) experiment was conducted (also as the only non-American project). We benefited from the new technologies of the light and strong materials for various components, which has contributed to the advancement of industry, particularly Boeing and Douglas (Jumbo Jet, DC10), or Chrysler in the automobile industry, and to the communications, cooperation and management. The first human flight to the Moon had, of course, a lot of philosophy in it, like in the other occasions in which crossing the borders of previously known and seen, retrospection, or fascinating and sometimes confusing sensations ask for deeper understanding of knowledge. Therefore, it is not unusual that Michael Collins, the third member of the Apollo crew, while he was sitting in the spacecraft during one of the Moon walks of his colleagues, said that he suddenly came to the idea that they should have taken on board a poet, a priest and a philosopher as well. "There we might get a much better idea of what we saw", said Collins. NASA carefully planned the Apollo mission in all aspects, including the impressions in the public and influence on the cultural history. We all know the words of Neil Armstrong, the man who made a first step on the Moon, with his left leg. A bit of confusion introduced the small mistake in his famous sentence: "That's one small step for [a] man; one giant leap for mankind", in which he – by mistake or for some other

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See also M. Bauer, N. Allum, S. Miller, "What Can We Learn from 25 Years of PUS Survey Research? Liberating and Expanding the Agenda".

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See e.g. Edgar W. Jenkins, "School Science Citizenship and the Public Understanding of Science", *International Journal of Science Education* 21 (7), 1999, pp. 703–710, and Elisabetta Falchetti, Silvia Caravita, Alessandra Sperduti, "What Do Laypersons Want to Know from Scientists? An Analysis of a Dialogue between Scientists and Laypersons on the Website Scienzaonline", *Public Understanding of Science* 16 (4), 2007, pp. 489–506.

18
E. W. Jenkins, "School Science Citizenship and the Public Understanding of Science".

19
E. Falchetti, S. Caravita, A. Sperduti, "What Do Laypersons Want to Know from Scientists? An Analysis of a Dialogue between Scientists and Laypersons on the Website Scienzaonline", p. 503.

20
Ibid.

21
European Commission, *Special Eurobarometer 282: Scientific research in the media*, Brussels 2007, http://ec.europa.eu/public_opinion/archives/ebs/ebs_282_en.pdf.

22
E. Falchetti, S. Caravita, A. Sperduti, "What Do Laypersons Want to Know from Scientists? An Analysis of a Dialogue between Scientists and Laypersons on the Website Scienzaonline".

23
John Ryder, "Identifying Science Understanding for Functional Scientific Literacy", *Studies in Science Education* 36, 2001, pp. 1–44.

24
D. Brossard, D. A. Scheufele, E. Kim, B. V. Lewenstein, "Religiosity as a Perceptual Filter: Examining Processes of Opinion Formation about Nanotechnology".

reason – did not say "*a*" in front of "*man*" and changed the meaning. Could it be that it was not *lapsus linguae* but *lapsus memoriae*? Now there are doubts that Neil Armstrong was not the author of the famous sentence, but Norman Mailer, a missing poet on board, who successfully combined the beauty of expression with philosophical deepness of thought in this sentence.[25]

2. Superstring theory

Another example of the presence of philosophy in astronomy, which is also reflected in the media coverage, is the Superstring theory.

The idea that the nature is made of tiny strings which vibrate in the Universe made of 11 dimensions was never supported by empirical evidence. It is very difficult to explain and there is nothing that we already know that could help us describe the functioning of the Universe in such a manner. And yet it became popular in the whole world thanks to Brian Green's book *The Elegant Universe*, which has turned the unexplainable and impossible to describe into bestseller. Even more, superstring theory became a part of the popular culture, as we can see from the following dialogue from the CBS drama *Joan of Arcadia*:

"Luke: See, string theory provides a unified description of the universe.
I mean, it's like holy grail of physics.
Will: Yeah, like lasagne's holy grail of Italian food.
Luke: Not an exact analogy.
Will: Well, maybe when I see the strings."[26]

Science has the empirical validity and, separated from this, the esthetical values, argues James McAlister, philosopher who described how aesthetics and beauty help to formulate and accept scientific theories. Aesthetical values of science are not the sign of the truth, as Green also confirms. For him, the aesthetics in the theory is a sense for the elegance and the beauty of the structure.[27]

Philosophy and science are sometimes not in accordance, when new scientific ideas have to be communicated to the public. A part of modern philosophy says that the unexplainable should not be explained. Science communication apparently does not agree. How can we explain something for which we have no valid proofs or evidence, or something that is so complicated that not even the experts in the field can transfer it to other people? The answer is the popularisation of science. According to Alan Gross (1996), science is a theoretical achievement and in the centre is persuasion.[28] John Turney (2004) adds another possible explanation of the need to popularise theories that are difficult to explain: where there is a lack of evidence, the public support is needed.[29]

Modern cosmology is an example of the recognised need to effectively communicate its results to the broader lay public. Einstein, Heisenberg, Hawking, Penrose or Barrow are the authors of bestsellers, philosophical discussions with the reflections and explanations (sometimes with polemics, too) of what they have learned in their research. Here, philosophy is a logical continuum of scientific research. Brian Green's *The Elegant Universe*, or books written by physicist Richard Feynman and authors who popularised other scientific disciplines, e.g. evolution, molecular biology, genetics and so on, are also part of it. Their work in popularization of science strongly influenced popular account of science presented in the mass media as well.

3. Swine flu

The media/science/philosophy relation in our third case is completely different. Swine flu became public issue in the spring of 2009. New disease that shows the ability to cross species barriers appeared for the first time in the 1950s, but was not a public health problem until the spring of 2009. It reappeared in Mexico, affecting some pig farms first, but soon it spread among humans too. The disease had all preferable news values: it was relevant, and novel, it contained proximity, controversy, sensation and originality. The good news was also that it was bad news, dangerous and unpredictable. Croatian media reports about the new influenza were sensational and alarming. The importance was more on framing the swine flu issue than on providing reliable trustworthy information. One of the main characteristics of the media coverage of the A H1N1 flu was confusion. It was a completely new disease, an unexpected situation, and there were poor scientific knowledge and information about the new flu.

The confusion in the media was created in two different ways. First, the data reported by the media were not easily verifiable. There were various sources, mainly official reports from different countries, and the general impression was that they tended to downsize the extent of the influenza because of various reasons, such as tourism or diplomatic reasons. On the other hand, there were verifiable data from sources such as World Health Organization (WHO) or Centre for Disease Control (CDC), which sometimes differed and made the whole situation more difficult to understand. The media frame was negative. Media reported about the growing number of infected people around the world and fear. The data used to picture the situation were frightening: in one day the number of the closed schools in the USA grew 40%, there were official suggestions not to travel and to avoid closed areas with many people (e.g. *Vjesnik* and *Jutarnji list*, 4–6 May 2009). The official statements also created alarming tone in the coverage of the swine flu. In her clumsy attempt to avoid "unnecessary panic" and to "fulfil her duty" Margaret Chan, WHO, said: "The 6th level (of disease spread danger) does not mean that we are facing the end of the world." She also said that the new wave of the disease could be much more dangerous (*Financial Times*, 4 May 2009, quoted in *Jutarnji list* and *Vjesnik*, 5 May 2009). American president Obama dedicated his message to the new influenza; experts were predicting pandemics (e.g. Michael Ryan, WHO, *Jutarnji list*, 5 May 2009). Some media reported about the airplane which had to land due to the panic because a women was coughing, and the Harvard University which was closed because of the fear of spreading the virus ("A women's cough landed Boeing 777", *Jutarnji list*, 3 May 2009). The others wrote about the world

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Neue Züricher Zeitung, 20 July 2009.

26
Thomas Garrings, "Shadows and Light", television series episode, *Joan of Arcadia*, CBS, New York 2005.

27
Quoted from Rachel Edford, "The Elegance of *The Elegant Universe*: Unity, Beauty, and Harmony in Brian Greene's Popularization of Superstring Theory", *Public Understanding of Science* 16 (4), 2007, pp. 441–454.

28
Alan G. Gross, "Rhetoric of Science", in: Theresa Enos (ed.), *Encyclopedia of Rhetoric and Composition: Communication from Ancient Times to the Information Age*, Garland Publishing, New York 1996.

29
John Turney, "Accounting for Explanation in Popular Science Texts – an Analysis of Popularized Accounts of Superstring Theory", *Public Understanding of Science* 13 (4), 2004, pp. 331–346.

fearing from the fatal diseases (*Vjesnik*, 1–2 May 2009). *Novi list* published, on 2 May 2009, a story from Mexico City, "the city of fear and tears", "in the dark and deserted", once the city of friendly people who now "don't shake hands and keep the distance". It reported about the lack of "masks and Tamiflu" (the antiviral medicine), without even mentioning how the flu started, or about the current state of the epidemics. Media focused more on creating the atmosphere than on informing. Their main task was to frame the new disease issue and to create a picture of danger, mystery and fear, and not to provide reliable information.

Media and philosophy

While philosophy was integral part of the media reports about astronomy (the 40th anniversary of the first human mission to the Moon, Cassini-Huygens or Superstring theory), in the swine flu case philosophy is not present *per se*, or as the approach according to which journalists and editors ask themselves about the relevance, credibility or the effects of the information, as it is presented in tables 2 and 3.

The picture of science	The goal	How is it achieved
fascinating, thrilling; big discoveries; new horizons; useful for us	to explain, bring closer, picture, intrigue, inform, entertain, surprise with the new details; involvement (science in the making)	storytelling, metaphors, enough information; relation to philosophy, politics, religion; fair and objective reporting

Table 2: Media coverage of astronomy

The picture of science in media coverage of astronomy is fascinating and thrilling (expectations of the Apollo landing on the Moon or Huygens landing on Saturn's moon Titan, particularly after the fiasco of another British space mission, Beagle 2). Here, science is the story about the greatness of humankind, about big discoveries and achievements of science and technology that can be used in our everyday life making it more comfortable and efficient. Therefore, storytelling style, metaphors and emotions are very important in the media coverage. In the Huygens case it was the excitement and happiness of the scientific teams involved in the mission, in live broadcasting of the science-in-the-making, with scientists' off-the-cuff comments, which are widely reported.[30] In both cases of the Apollo and Cassini-Huygens mission, science is also related to politics. It is an additional news value and the way to achieve more prominence and importance. Religious metaphors are often invoked, and involvement of philosophy adds a new, reflective dimension and value. There is a picture of sensational (but not sensationalistic!) science, and the possibility of failure (there was a lot of concerns about the Huygens mission after Beagle 2 crashed on Mars) does not make it more complicated to report. On the contrary, the excitement makes the success even bigger, and journalists seem to appreciate the situation of uncertainty and seem not to care much about the missing peer-reviewed process that in most of the cases usually is a step before going public with the scientific information. The philosophy is incorporated in media reports about astronomy, particularly in modern cosmology.

The picture of science	The goal	How is it achieved
not in the focus; science is important, but also impotent; peripheral	to excite, alarm, attract the attention; sell the newspaper; to serve the goals of pharmaceutical industry?	hype, metaphors, speculations; selection of information and quotations; non reliable information; sensationalism;

Table 3: Media coverage of the swine flu

Media coverage of the pig flu in Croatia is completely different. Science is not in the focus, particularly not at the beginning of the epidemics. Of course, science was important. We needed to isolate the virus, describe its properties, and create laboratory chains in order to produce the vaccine. There were human lives to be saved; there were epidemics and possible pandemics to be controlled. But, science was not efficient enough. The story of swine flu was simply not the story about science, but the story about a cataclysmic danger, which was described by the excessive use of hype and exaggeration. The lack of reliable information, statements that provoke fear and uncertainty, sensationalistic catchy headlines and layout were used to excite the public and to sell the newspaper. The public information about the new influenza, and later on about the vaccine was compromised. The lack of reliable information opened the way to doubts about the possible interest and influence of the pharmaceutical industry on the media coverage of the pig flu epidemics, together with conspiracy theory about the origin of the H1N1 virus and about the vaccine.

Philosophy and the media

Both cases analysed here show how the media can, by using saliences, affect the public agenda and create certain atmosphere by framing the issues they report about. Also, it is clear that the audience needs reliable information, and it was stated also by some of the most prominent scientists and experts (e.g. Ivan Đikić in *Vjesnik*, 16 May 2009, or Alemka Markotić for *Croatian Radio*, 30 December 2009). Not long ago philosophy was a part of science, and it still is, as we have seen in astronomy, particularly in the case of modern cosmology. Despite the existing gaps in other fields, philosophy is or should be a part of science not only when there are "big" questions seeking for "big" answers, like the question about the origins of the universe or life, or the issues related to the theory of relativity, or when science cannot offer clear, precise answers or explanations, e.g. related to the Superstring theory. It seems that today scientists sometimes try to avoid those "big" questions, like media do, as if they assume that people are interested more in information only and in the everyday issues, which are present in their lives.[31] On the other hand, the focus on the practical issues is not without the deeper reflection, like those about science in the media, as we can sometimes witness reading the letters to the editor in our daily newspapers or on-line commentaries which are published

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Blanka Jergović, Steve Miller, "Framing Space: UK Newspaper Reporting of the Beagle 2 and Cassini-Huygens Space Missions", *CAPjournal* (3) 2008, pp. 5–11.

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E. Falchetti, S. Caravita, A. Sperduti, "What Do Laypersons Want to Know from Scientists? An Analysis of a Dialogue between Scientists and Laypersons on the Website Scienzaonline", p. 501.

within online editions, in blogs or on various social networks like Facebook. The media public also needs guidelines in order to create the meaning from the media science, and make it useful and valuable in everyday life.

In a sense of reflection and guiding the way of thinking about certain issues, philosophy should be present not only there where "big" questions or reflections are at stake, including new diseases (e.g. the swine flu) or a new treatment. Media representation is then the continuation of the scientific process in which the research, intra-scientific communication, evaluation, publishing and communication to the lay public are the usual steps. The decision making process about the application or about the continuation of research is a logical process of production and dissemination of the knowledge in the modern society, where science is a part of our culture and environment. In the attempt to create a story from the information about the research or new results, the media also need guidelines. In the best case scenario, they need to select information and the way of presenting them could compete with other issues for the time in the broadcast media or space in the press, and at the same time not to distort or compromise this information. Philosophy in this choice between the good and the bad, between right and wrong offers the solution in its "frame" and philosophical discipline, in ethics.[32] The presence of philosophy as a paradigm, which helps in the media everyday routine of selecting the sources, the information and the style of presentation, could help to gain credibility and audiences.

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Blanka Jergović

Filozofija, znanost i mediji

Sažetak

*U kompleksnom ispreplitanju znanosti i javnosti već je Oton Kučera krajem 19. stoljeća vidio važnu ulogu filozofije »koja savjesno računa sa napretkom prirodne znanosti« kojoj »stadosmo na prag« s novim razumijevanjem prirodnih procesa i pojava. Budući da su mediji u približavanju znanstvenih informacija javnosti nesumnjivo najučinkovitiji, ovdje ću prikazati rezultate recentnih europskih i američkih anketa o informiranosti javnosti o znanosti (*Public Understanding of Science*), o stavovima javnosti prema znanosti i očekivanju javnosti od znanosti. Ukratko ću se osvrnuti na utjecaj medija s obzirom na sadržaj i na neke od modela komuniciranja*

32 Danijel Labaš, *La funzione del principio della responsabilita nella fondazione etica dell'informazione-comunicazione*, Zagreb 1999.

znanosti te opisati vrste i osobine publike za znanost u javnosti. Naime, korelacija znanja i pozitivnih stavova postoji do određenog stupnja informiranosti i dosadašnje su studije pokazale da kod donošenja odluka ili zauzimanja stava prema osjetljivim ili rizičnim pitanjima veliku ulogu imaju vjerovanja, više nego informiranost ili znanje. Nakon analize nekolicine studija slučaja, moj će zaključak biti da filozofija može pomoći upravo u tim najslabijim točkama javnoga razumijevanja i prihvaćanja znanosti.

Ključne riječi

filozofija, mediji, utjecaj medija, znanstvena komunikacija, astronomija, svinjska gripa

Blanka Jergović

Philosophie, Wissenschaft und Medien

Zusammenfassung

In der komplexen Wechselbeziehung zwischen Wissenschaft und Öffentlichkeit – bereits Ende des 19. Jahrhunderts – hat Oton Kučera eine belangvolle Rolle der Philosophie erkannt, die mit dem Aufschwung der Naturwissenschaften rechnet, der mit einer neuen Lesart der Naturprozesse und Phänomene eingesetzt hat. Es ist unbezweifelbar, dass die Medien in puncto Näherbringung der Wissenschaft an das Breitpublikum am effektivsten sind. Aufgrund dessen vergleiche ich in der vorliegenden, kurz gefassten Präsentation, die Ergebnisse der Public-Understanding-of-Science-Meinungsforschung *(PUS), welche sich mit dem Wissen von, den Erwartungen von sowie der Einstellung zur Wissenschaft befasst. Ich erörtere den möglichen Einfluss der Medien hinsichtlich des Inhalts und präsentiere etliche Modelle der Wissenschaftskommunikation, als auch die Publikumstypen und -eigenschaften für die Wissenschaft in der Laienöffentlichkeit. Zahlreiche signifikante Studien haben abgehandelt, dass die Korrelation zwischen dem Wissen und der positiven Haltung nur bis zu einem gewissen Punkt existiert, wie auch dass die Überzeugungen eine schwerwiegende Rolle bei der Gesinnungsbildung sowie dem Entscheidungsprozess in heiklen Fragen bzw. beim Wagnis spielen. Nach der Analyse einiger Fallstudien wäre meine Schlussfolgerung, dass Philosophie die Wissenschaft-Medien-Öffentlichkeit-Beziehung an ihren Schwächststellen zu verbessern vermag.*

Schlüsselwörter

Philosophie, Medien, Medieneinfluss, Wissenschaftskommunikation, Astronomie, Schweinegrippe

Blanka Jergović

Philosophie, science et médias

Résumé

*Dans l'interaction complexe entre la science et le public, déjà Oton Kučera avait vu le rôle important de la philosophie qui compte sur l'avancée des sciences naturelles, amorcée par la nouvelle compréhension des processus et des phénomènes naturels. Puisque les médias sont sans doute le moyen le plus efficace lorsqu'il s'agit de familiariser un public plus large à la science, je présenterai ici les résultats de récentes enquêtes d'opinion européennes et américaines sur l'état de connaissance (*Public Understanding of Science*), les attitudes et les attentes du public à l'égard de la science. Je reviendrai brièvement sur l'influence des médias par rapport au contenu ainsi que sur certains modèles de communication scientifique, puis je décrirai les types et les caractéristiques de publics profanes pour la science. En effet, de nombreuses études ont montré que la corrélation entre la connaissance et les attitudes positives existe jusqu'à un certain point seulement et que les croyances, plus que l'état d'information ou la connaissance, jouent un rôle important dans la prise de décision et l'adoption d'attitudes par rapport aux questions sensibles ou le risque. Après avoir analysé plusieurs cas d'étude, je conclurai que la philosophie peut justement améliorer les points les plus faibles de la compréhension et l'acceptation publique de la science.*

Mots-clés

philosophie, médias, influence des médias, communication scientifique, astronomie, grippe porcine