

## 21. Panel discussion: How to educate and train scientists and science communication students to perform well in science communication activities

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### Introduction

When the first call for papers went out for the PCST conference 2012 in Florence, many researchers reacted to the theme of ‘professionalization’. From their suggestions for contributions it immediately became clear that the term was considered from a great variety of angles. Quite a few suggestions could be linked to the question of how to educate and train scientist and science communication students to perform well in science communication activities. Four speakers participated in a session focussed on this issue:

- Midori Takahashi, PhD, Shizuoka Science Museum in Japan: ‘Training Local Citizens as Science Communicators in a Science Museum as a Means of Cultivation of Science and Technology.’
- Liesbeth de Bakker, MSc, Freudenthal Institute for Science and Mathematics Education in The Netherlands: ‘Empowering science PhD students for engagement-oriented science communication.’
- Dr Ann van der Auweraert, Delft University of Technology in The Netherlands: ‘Science in dialogue training.’
- Dr Will J Grant, Australian National Centre for the Public Awareness of Science: ‘Development and challenges in science communication education.’

Caroline Wehrmann, assistant professor in Science Communication of Delft University of Technology in The Netherlands, moderated this session.

Five main questions arose: who has to be trained or educated in science communication, which educational approaches are used, how to design programmes or courses, what are the insights of evaluation of education programmes and what are the challenges in educating science communication practitioners? In this paper each of the above five questions will be addressed based on the four presentations that were given.

### Who has to be trained or educated?

In science communication training programmes, students, scientists and science communication professionals are generally considered to be the main target groups. And indeed most of the speakers deal with training or education programmes which have such a target group. However, the presentation of Midori Takahashi focused on training a different target group: representatives from the lay public. These representatives are selected from



specific segments of the general public: 1) high school pupils, 2) university students and other interested adults and 3) retirees and / or housewives who have experience in science and technology. It is argued that they could be the ideal communicators within the Shizuoka Museum in Japan to introduce emerging social issues and to facilitate discussion. Each of those groups has to get a tailor-made training programme, and contributes in their own specific way to create a platform for cultivating science and technology in a local area.

### **Which educational approaches are used?**

Engaging the public is a common teaching objective in some of the science communication courses as described in the presentations. Liesbeth de Bakker explained the educational approach she used to reach this teaching objective. In her science communication course for science PhD students the course design is based upon notions derived from constructivism (Woolfolk, Hughes & Wallop, 2008). Social constructivist views on learning emphasize the active role of the learner in building understanding and making sense of information. Therefore engagement is important. So the course participants worked together as a learning community. At the same time each participant could tailor the course to his or her needs (concern-based). Science communication skills were learned in real life situations with real lay public (situated learning / context-based). The PhD students, ideally from different science backgrounds, learned a lot from and together with each other through feedback sessions (experiential learning). As a consequence the role of the teacher was that of facilitator of the learning process and rather than instructor.



The teaching approach of the training course of Midori Takahashi at the Shizuoka Science Museum was also based on constructivism and discovery. The course participants learned to be science communicators through personal experience, reflection and feedback.

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### **How to design a course with a focus on engagement?**

Ann van der Auweraert explained in her presentation in detail the design of her course at Delft University of Technology focusing on dialogue training. In developing this training the use of the participatory learning process is striking. The idea is to co-create knowledge through genuine dialogue. Both science communicator, in this case a scientist, and stakeholder share their knowledge and learn from each other by discussing issues from various perspectives. They use different frames and assumptions, deal with different values, norms and emotions, with controversies and uncertainties, and with types of knowledge other than pure academic knowledge. The participatory learning process is, according to Van der Auweraert, aided by substantive theoretical input, relevant and engaging case studies, simulations and practical exercises. One of the prerequisites is that all participants have to be open-minded and motivated to share knowledge and ideas.

### **What are the insights from evaluation of education programmes?**

Once a course developer has decided upon his educational approach and course design he has to consider how to evaluate his course properly. One of the most important questions is whether or not the main learning objectives have been realised. In the case of the science

communication course for science PhD students (presented by De Bakker) a first critical reflection showed that the course did not meet its objective of fostering more engagement-oriented science communication. There seemed to be a gap between the call of the science communication research field for more engagement-oriented science communication (Wynne, 1991; Durant, 1993) and the practical and educational needs of the actual science communicators (in this case the PhD students who followed the course in science communication at Utrecht University).

The PhD students all agreed that in principle engagement-oriented science communication is a good thing, but they did not see the relevance of it for their own work at this moment. Therefore very few of them have invested in engagement-oriented activities after having finished the course and very few are willing to invest in education or training which is more engagement-oriented. They see this as something only relevant at a later stage in their career. For the moment these PhD students mainly wanted to develop or improve their basic communication skills to get their message across to the public, e.g. skills based on the sender-driven model of science communication.

### **What are the challenges?**

From the presentations a general issue emerged. It seems that while the science communication research field is calling for more engagement-oriented science communication, the practitioners themselves tend to use the sender-driven model. Takahashi mentioned that her students preferred to be told what to do instead of using constructivism as an educational approach: constructivism or 'learning by doing' takes (too much) time. De Bakker identified a related problem. In her opinion it is hard to 'teach' engagement in science communication to junior researchers who have just taken their first steps on the path of science communication. They tend to prefer and implement science communication activities which are based on the sender-driven model.

Will Grant saw some other major challenges in the broader field of science communication. He noted that within academia there still is resistance amongst faculties ('Everybody can communicate, can't they?'). This is partly caused by the fact that the visibility of the science communication discipline is not very high. Even within the science communication community the views on what constitutes the science communication discipline diverge. He also mentioned challenges in the field of ethics of science communication and in formulating codes of conduct of science communication practitioners. Grant stated there is still a disparity between the researcher who focuses on theory and the practitioner who often is not convinced of the necessity of using theories, and has to deal with limited time and money.

### **Final remarks**

The four presentations in this session all shed light on different aspects of a common theme: education for professionalization. This approach resulted in a broad overview of important issues which are interrelated. In this way a small step was taken to address important challenges in this field. Those interested in joining the deliberations on professionalization in science communication are invited to contact Caroline Wehrmann ([c.wehrmann@tudelft.nl](mailto:c.wehrmann@tudelft.nl)).



## References

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