22. Empowering science PhD students for engagement-oriented science communication

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Summary
In science communication there’s a call for more engagement-oriented approaches but at the same time it seems science communicators are not ready (yet) to put them into practice. This empirical qualitative evaluation of an engagement-oriented science communication course shows that science PhD students who voluntarily followed the course have a positive attitude towards engagement with the public but don’t act accordingly in their communication behaviour. They see it as something more relevant for later in their careers. Based on the study’s findings, advice is given for improved teaching on engagement-oriented science communication.

Introduction
Engagement has become an important issue in science communication literature (Wynne, 1991; Durant, 1993). As a result science communication courses have turned their focus towards more engagement. Since 2007 the Freudenthal Institute for science and mathematics education (FIsme) of Utrecht University is offering such a course to science PhD students.

From a critical retrospective on this course carried out in 2010 (de Bakker & Waarlo, 2010), it emerged that one of the main goals of the course – to establish engagement – was not met. Course participants appeared not to practise it yet, although the first step in terms of awareness-raising on the issue of engagement had been made.

So how to adapt the course to better fulfil its aim? This empirical qualitative evaluation study aims to come up with suggestions through answering the following research questions:

- What are the longer-term learning outcomes of the science communication course for science PhD students in terms of knowledge, acquired skills and attitude towards engagement in science communication?
- Do the PhD students perceive a need for more engagement-oriented science communication after the course? If so,
- What are their expressed learning needs to qualify themselves further for engagement-oriented science communication?
Theoretical framework

Conceptual analysis engagement

The critical retrospective itself and the discussions that ensued at the PCST conference 2010 revealed a lot of confusion and different views surrounding the notion of engagement within science communication. This indicated a need for further conceptual clarification.

A literature review showed that engagement should best be seen as part of two-way communication, and therefore outside the realm of the classic, sender-driven model of science communication. Engagement in science communication can further be defined by ‘aim’, ‘process’ ‘knowledge types’, ‘control’, and ‘reflective practice’. These variables seemed helpful in analysing the self-reported science communication behaviour of course participants.

Studying engagement in the course participants

For engagement-oriented science communication to take place, the course participants need to have the right attitude, skills and social environment. So these aspects were studied following Van der Auweraert (2008) who explored the science communication behaviour of scientists, using the model of planned behaviour (Ajzen, 2005). Based on this model (see figure 1) interview questions were formulated and interview data was analysed.

Method

Science communication course

The course design is based on commonly held notions within the Freudenthal Institute derived from constructivism (Woolfolk, Hughes & Wallop, 2008). The course characteristics are: concern-based, situated learning (hence also context-based), experiential learning, and the teacher as ‘facilitator’. It links theory of science communication to practice by facilitating participants to present their own PhD research projects to (real live) audiences with the intention of engaging publics and fostering dialogue.

Respondents

The respondents in this study are 12 PhD students out of a total population of 60 former
course participants. All 12 participated in the years 2009 or 2010 in the science communication course, so the longer-term effects of the science communication course could be studied. Care was taken that the sample was a fair cross-section of the whole population of course participants in terms of gender balance and scientific background.

Data collection and analysis

All respondents were interviewed for about an hour. The full sessions were audio recorded. The interview questions were based on Ajzen’s model of planned behaviour and the study’s research questions. In order to get a more in-depth insight into the respondent’s attitude towards engagement a ‘profile’ sheet was developed (see figure 2) based on the variables that help determine (the level of) engagement.

All interviews were transcribed and analysed. Based on the total results of the analysis, all participants were evaluated on their personal longer-term outcome of the course and it was determined where they stand in terms of engagement-oriented science communication.

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Figure 2: ‘Profile’ form for respondents. For different variables respondents were asked to tick the boxes that best matched their self-reported behaviour in science communication and to clarify their answers.
Results

Attitude: All twelve respondents confirmed that during and after the course they started ‘putting the public first’ when working on a communication product (receiver-oriented approach). In terms of attitude towards engagement-oriented science communication, eight are positive and four are negative. Those with a negative attitude perceive the public as not having the right or enough knowledge to be a valued partner in a dialogue about the PhD’s research project.

Social norm: Half of the respondents said that in terms of their science communication activities their environment was indifferent, the other half said their environment allowed it but didn’t stimulate it. As far as their supervisors are concerned, the PhD research has to come first. Science communication activities have to be carried out (mainly) in the student’s own spare time.

Self efficacy (knowledge and skills): Respondents have been quite inactive in terms of public science communication. Sender-driven communication activities dominate over receiver-oriented communication activities.

When looking at the background characteristics of the respondents (i.e., knowledge paradigm; professional identity; research orientation) it was found that they corresponded nicely to an open or closed attitude towards engagement-oriented science communication.

Seven out of the twelve respondents said they were not in need of more engagement-oriented science communication. Three said, ‘not yet’ and two were positive about it.

About twice as many sender-driven communication activities were mentioned compared to engagement-oriented activities, 20 and 11 respectively. Examples of engagement-oriented activities given are: dialogue workshop, real life experiences, and interactive workshops with a real lay audience. The educational approach of the course should be based on constructivist notions, e.g. learning by doing, (peer) feedback, and situated learning.

Conclusion

The main conclusion from this study is that there seems to be a gap between the call of science communication researchers 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 agree that in principle engagement-oriented science communication is a good thing but they don’t see the relevance of it yet for their own work. Therefore very few of them have invested in engagement-oriented activities and very few are willing to invest in education or training which is more engagement-oriented. This is seen as something relevant only at a later stage in their career.

Suggestions for improved teaching of engagement-oriented science communication include an intake procedure for potential course candidates. Only those scientists in need of a more engagement-oriented approach in their science communication course will get it taught. It is expected senior scientists and scientists who are more constructivist, society-oriented and work more trans-disciplinary, will be more in need of engagement-oriented science communication. In addition, the course itself should be concern-based, and use principles of
experiential and situated learning with the teacher as facilitator rather than instructor.

Finally, barriers should be taken down: the course should offer more workshop type / dialogue elements, it should be clear that engagement has added value, the work environment should be more supportive (involve supervisors), and the added value of the public’s knowledge about research should be clarified and emphasised.

Bibliography


