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Engaging the Public in Engineering Science – Successful Measures for a Public Dialog

Isabell Harder^a, Carolin Walter^{a*}, Ekkard Brinksmeier^a

^a University of Bremen, Foundation Institute of Materials Science, Badgasteiner Straße 3, 28359 Bremen, Germany

Abstract

In a world of increasing technical complexity, science has to invite the public to participate. This paper introduces the “Triad of Successful Science Communication” (TSSC). TSSC is an advanced approach to bridge the gap between elaborate discussions of engineering science and the needs of understandable public discourses. So far, the field of engineering science communication is largely based on trial and error. TSSC is the first practical guideline concept to help engineers and scientists to choose the right instruments for science communication. To make a practical implementation feasible the approach is presented in combination with selected case studies such as measures based on online science communication, direct interaction with adults (science events) and children (kids university), and ways to empower young students as future multipliers in science and society. It is shown that using the TSSC is considerably helpful to design such activities for a lively and productive dialog between engineering sciences and the public.

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1. Introduction

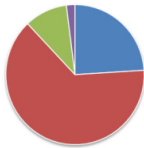
“New scientific advances - and indeed new technologies based on existing knowledge - are allowing our lifestyles to change at a faster rate than ever before. Today, more than ever, we are relying on science and scientists to help us answer questions and address problems that were unthinkable even just few years ago”[1]. In 2013,

*Corresponding author. Tel.: +49-421-218-51374; +49-421-218-51333
e-mail address: cwalter@iwt-bremen.de

UNESCO's Director of the Division of Science Policy and Sustainable Development, Lidia Brito, outlined today's interdependence of social prosperity and science. A survey of the German science communication initiative "Wissenschaft im Dialog" (WiD) in 2015 [2] reinforced Brito's conviction. It showed that majority of the respondents were sure that science has the power to improve life (fig. 1). Science communication meets the society's demands for information and transparency [3]. It is an integral part of inclusive, people-centered science policy design and one of the major tools to mobilize and empower a society in which people are intrigued and inspired by science [1].

How will science influence the life of future generations?

- science will lead to a better life: 24 %*
- science will cause improvement as well as problems: 64 %*
- science will cause mostly problems: 10 %*
- not specified: 2%



* In June and July 2015 TNS Emnid conducted 1004 telephone interviews (land line) with a statistically significant sample of german citizen (>age 14)

Fig. 1: The representative survey "Wissenschaftsbarometer 2015" showed that the majority of the respondents are sure that science has the power to improve lives [2]

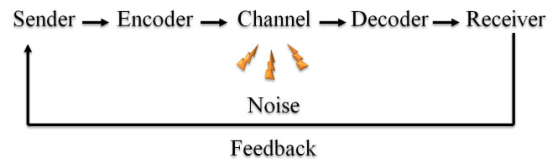


Fig. 2: Shannon-Weaver's Model of Communication [5]

Brito also emphasizes how challenging it is for scientists and science communicators, to disseminate scientific information. The challenging target is to make the achievements of science comprehensible and accessible without reducing or over-simplifying the content [1]. Another great challenge is the selection of a medium that fits both, the needs of the audience and the engineering community. Basically, all these challenges have already been identified clearly. Nevertheless, engineering science communication is still a field largely based on trial and error. Because of poor knowledge of science communication and lack of practical experience, engineering scientists often struggle communicating their scientific achievements. The "Triad of Successful Science Communication" (TSSC) is a new practical guideline to help researchers coping with their task in a more strategic way. So far, only limited preliminary work is known which addresses the scientific analysis of strategic communications in engineering sciences. Therefore, TSSC was developed without support of an elaborated state of the art. The approach reported here has been developed by looking into three case studies: measures of online science communication, direct interaction with adults (science events) and children (kids university), as well as empowering young students being future multipliers in science and society. It should be noted that the approach here is based on the perspective of European respectively German engineering science communities. Therefore, it has been elaborated for a relatively high educated audience. In consequence, the transferability of our findings to other disciplines or societies dealing with different kinds of challenges such as lack of education is limited [4]. However, it is assumed that the TSSC can principally be adjusted to divergent demands and by this, could be helpful for different ways of public dialog on science all over the world.

2. The Triad of Successful Science Communication

As an interdisciplinary team of engineering researchers and communication scientists, the authors were able to identify and develop strategies for science communication that benefit both from the engineer's enthusiasm for technical achievements and the communicators' awareness of the requirements for a successful dialog. The Shannon-Weaver model of communication [5] (fig. 2) was already developed in the 1940s and has often been

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