Competence Framework

Science communication training equips participants with the ability to reflect on certain circumstances of communication practices, for example, topics they communicate or specific requirements of the platform they use (e.g., interactive features; Howell & Brossard, 2020). Often, short training courses for scientists and practitioners teach practical communication skills, for example, how to use media or how to approach audiences (e.g., Miller & Fahy, 2009; Silva & Bultitude, 2009). In contrast, degree programmes in science communication encompass theory and professional development in a more comprehensive approach (Mulder et al., 2008) and therefore help to provide a bigger picture (Turney, 1994).

In both cases, research on science communication training highlights the need to develop generalisable learning outcomes for science communication, especially with regard to different contexts of information and communicator roles (Baram-Tsabari & Lewenstein, 2017). Moreover, the overall understanding for societal and media changes is emphasised, as these developments are crucial for science–society interactions. Reflecting on these new conditions also promotes science communicators' self-perceptions and helps them to develop adequate roles for the constantly changing communication environment (Baram-Tsabari & Lewenstein, 2017; Pieczka, 2002).

Against this backdrop, we developed a science communication competence framework as a foundation for the training toolbox. The competence framework draws on existing research on science communication training; most importantly, we refer to the approaches by Baram-Tsabari and Lewenstein (2017) and Pieczka (2002). Furthermore, the framework takes the conditions of science communication in the digital media environment into account (Neuberger et al., 2019; Pieczka, 2002), as these influence science communication fundamentally.

The competence framework encompasses three distinct but mutually enforcing layers: we distinguish competences referring to the overall picture of the world, professional norms and roles as well as to working knowledge.

Competence level	Refers to	Develops through
Picture of the world	• Overall mental models • Perceptions of the changing societal framework in which science communication takes place and how it affects the conditions for the interactions of science and society	• Offering new insights and perspectives • (Guided) observation and reflection • Challenging existing mindsets and worldviews
Professional norms and roles	• What it means to be professional • Guiding norms, values, demands and role models developed by science communication as a field of practice • Self-perceptions and others' perceptions of roles	• Getting to know and adopting professional standards • Interaction, (self-)reflection, feedback, development and adjustment of professional attitudes
Working knowledge	• Skills and practical knowledge • Capability to deal with technical, strategic and operational demands of everyday science communication practices	• Getting to know models, methods and techniques • Practical training, e.g., use of examples and application to other cases • Analysing problems and failures and searching for methods of improvement

Table. 1: Competence layers as a basis for science communication training (categories adopted from Pieczka, 2002; Baram-Tsabari & Lewenstein, 2017)

Competence Framework

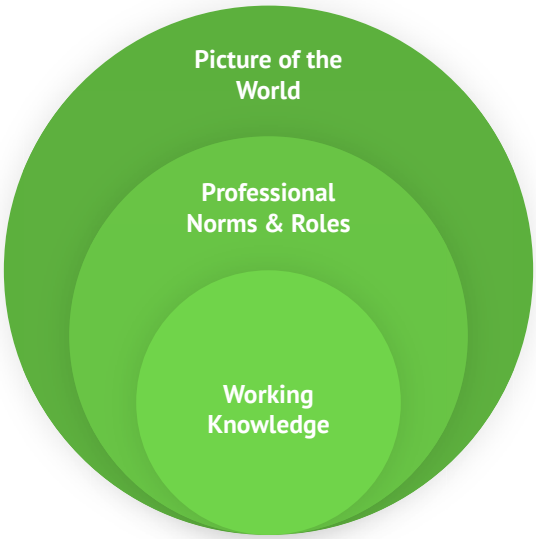

Fig. 2: Competence layers as depicted throughout RETHINK's SciComm Navigator.

Picture of the world

Pieczka (2002) described societal changes due to globalisation and digitalisation and related demands for professional (science) communicators. Emerging formats are characterised by activity and pace and their ability to allow citizens to take part in an environment with 'new orders of knowledge' (Neuberger et al., 2019). Apart from positive effects like new fora for deliberation and more flexible modes of communication, these structures provide risks that science communicators should be aware of, for example, the misuse of science-related information. Based on these societal developments, Pieczka (2002) built a framework that he/she described as a picture of the world, which serves as the outer layer of the competence framework. To develop the picture of the world within training means to develop students' mental models, how they perceive the changing societal framework in which science communication takes place and how it affects the conditions for the interaction of science and society. Competences that refer to the picture of the world can be developed by offering students new insights, taking on new perspectives, supporting students to make their own and reflect on others' observations and challenging mindsets and worldviews in the context of interactional approaches.

Professional norms and roles

The second layer of the competence model describes professional norms and roles for science communicators and how they have changed in the context of the digital media environment. These competences refer to specific attitudes and norms that professional communicators take up to distinguish themselves from non-professionals (van Ruler, 2005). For instance, these competences include applying integrated communication on different channels, considering ethical standards and being aware of the importance of evaluating science communication. Against this backdrop, being aware of one's and others' roles and related demands (e.g., knowledge broker, curator, bridge builder, enabler) and being able to fill these roles are also important competences. Developing these competences requires getting to know and acknowledging them in the contexts of training and practical experience. Within training programmes, learning approaches that foster interaction and (self-)reflection and allow for feedback, development and adjustment of professional norms and roles are most fruitful.

Working knowledge

Additionally, science communicators need to be equipped with competences and skills to work in a digitalised world. This encompasses technical knowledge of media and digital tools as well as practical skills to transfer communication through different channels. Moreover, science communicators also require competences to develop communication strategies, adapt models for risk or crisis communication or apply specific formats, to name but a few examples. Following Baram-Tsabari and Lewenstein (2017), the will to keep up with new developments displays a dimension in its own within this category. Moreover, critical thinking is needed when assessing the risks and opportunities of digital media. Developing these tools calls for the teaching of models, methods and techniques required in professional science communication. Moreover, practical training is required to equip students with the necessary competences.

Competence Framework

Recommended reading

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