

Best-practices for science communication

Six virtues for the reflective science
communication practitioner



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six virtues for the reflective science communication practitioner

Digitalisation and the rise of social media, fragmentation and commercialisation of science communication interfaces, the increasing sensational value of scientific information, politicisation of science in public debates and science scepticism have fundamentally changed the way in which practitioners experience and engage with their work (Roedema et al. 2022, forthcoming). How can - and should - science communication practitioners respond to these challenges? We have seen in our research that practitioners' worldview, values, perspective on science and assumptions on audience influence the way in which practitioners undertake science communication activities (Roedema et al., 2021). This means that it is important for practitioners to rethink and reflect on the perspective they take on science, their audience and, consequently, the activities they undertake to bridge between science and society (Roedema et al., 2021). These insights have motivated the RETHINK project to facilitate a reflective practice for science communicators.

Reflective practice is valuable for practitioners who need to deal with complex realities or fast-changing communication environments (Ramaker et al., 2015). Reflective practitioners are professionals who are aware of how their science communication activities are influenced by their worldviews, their ideologies, and the institutions or economic and political conditions they are surrounded with (Schön, 1983). Practitioners might deploy reflection-on-action as well as reflection-in-action, meaning that reflection can take place after activities have been carried out or in the moment of an activity (Schön, 1983). This helps learning about what happened in certain situations and interactions, underlying factors to why something happened, and how a science communication practitioner can transform their practice to navigate a specific situation whilst it is happening.

In earlier RETHINK research, Rethinkerspace members have experimented with becoming reflective practitioners themselves (Roedema et al., 2021b). Over the past 3 years, the RETHINK project has established 7 so-called 'Rethinkerspaces', or local hubs with frontrunners in science communication theory and practice, across Europe. The Rethinkerspaces were created as Communities of Practice, wherein a variety of stakeholders who are involved in public discussions on science (stakeholders from science communication theory and practice, such as: SSH scholars, climate scientists, science policy makers, science museum employees, science journalists and science communication department employees working at research institutes), could discuss pressing challenges in the field of science communication. The focus of these Rethinkerspaces was always to explore possible directions for solutions to help practitioners navigate current challenges in the science communication ecosystem. Rethinkerspace members, together with RETHINK researchers, designed reflective practice experiments that could be carried out in the daily work of science communication practitioners, and that would help practitioners to deal with the challenges in the current science communication ecosystem. Rethinkerspace members kept track of their reflections and insights during their experiments in a reflection diary, as well as

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discussed these insights with other Rethinkerspace members in their local meetings.

Over the course of the RETHINK project, practitioners mentioned several challenges that practitioners wanted to address, and where deploying a reflective practice could be of value, namely: 1) a perceived disconnect between science communicators and ‘an unknown and anonymous audience’, (Barendse et al., 2021); 2) a desire for new science communication practices to deal with the increased polarisation, negativity and science scepticism in the (digital) public sphere (Roedema et al., 2021b); and 3) the notion that people make sense of science on the basis of their personal situation and social context, and rarely on the basis of scientific information or science communication outputs - leaving the sobering insight for practitioners to stay relevant and adopt their outputs to these personal and social contexts of their audiences (Rerimassie et al., 2021).

With help of reflection diaries, Rethinkerspace members challenged their assumptions about audiences, explored how their perspectives on science and society influenced the activities they undertook, and sought for new ways to get to know and address their audiences (Roedema et al., 2021b). Their insights and developed reflective practices have provided the RETHINK project with valuable lessons over the last years to what might constitute a best practice for science communication practitioners. This document showcases 6 characteristics of the reflective science communication practitioner. In visualisations and text, the document showcases some examples of the reflective practices developed by Rethinkerspace members. It has resulted in 6 virtues for the reflective science communication practitioner, and helps practitioners navigate the complexities of the current science communication field.

"The reflection diary helped me to think one step further. It showed me that we are limited by our own thoughts, assumptions and emotions about topics and people" - Science journalist from Poland.

Reflective practice

Single-loop learning = becoming aware of the problem or challenge in the situation.



*What is happening here?
What do I experience?
What is the situation?*

Double-loop learning = understanding underlying factors or mechanisms.



*Why is this happening?
Why do I act in this way?
What are the underlying*



*How do I know that I deployed the
right activity, or chose the right tone?
How can I reorient my perspective or
practice; and towards what?*

Triple-loop learning = a process wherein existing frames of thought are 'reopened', as to change the practice or undertaken activities more fundamentally.

Reflexivity



Understand that we all have our own assumptions and perspectives derived from personal, emotional, social, cultural, historical and political influences



Recognise that our own worldviews and contexts influence the information we find, how we interpret it, and what we deem trustworthy or the truth



Acknowledge that our actions influence the knowledge and perspectives of others and that these actions may in turn be judged through individual perspectives



Actively examine the assumptions embedded within our actions and experiences



Re-evaluate how our personal situation, fixed beliefs and social context influences the information we find and how we interpret it



and change your practice based on this re-evaluation

Openness



Open to and respectful of a wide range of evidence, sources, new information and perspectives; also when they may counter your own perspective or beliefs.



Be curious to what others have to say, suspend your judgements, and be honest about the limits of your own knowledge



Take a broad range of perspectives into account, and not only your own experiences and perspectives.



Be aware and respectful of others' goals, ideas and perspectives



Be prepared to revise perspectives and actions based on new information, evidence and insights



Embody a willingness to change your mind

VIRTUE 1

Open-up hierarchies between scientific experts and citizens

The Covid-19 pandemic has made it clear that society no longer just 'accepts' what science has to say - it has once again become clear that scientists need to come out of their ivory towers and interact with people and communities in society. It appears that everyone on the Internet is an expert, for scientific information is commercialised, and misinformation is generated and spread. Scientists and science communicators are then often quick to spread the popular narrative and attitude of 'defending' science to sceptics and 'combating' misinformation. Herein, the presumption of many is that "only science can provide reliable, verified facts for the public debate".

However, during the Covid-19 pandemic, we were increasingly confronted with the ambiguities of science: scientists disagreed on the scientific facts in public and science communicators pointed to the relevance of contextual and experiential knowledge. Apparently, next to scientific information, political, economic, ethical, cultural and social dimensions also play a crucial role in how scientific information is interpreted.

These insights have implications for the way in which science communicators practice their work. As science communicators, we need to recognise that our own worldviews and contexts influence the information we find, how we interpret it, and what information we deem trustworthy or 'the objective truth'.

Against this backdrop, becoming 'bridgers' between scientific information and experiential knowledge within society is essential to facilitate constructive public discussions on science. Science communicators can do this by 'breaking the ice' between scientific authorities and citizens, and focus on facilitating personal bonds.

Rethinkerspace members in the RETHINK project pointed towards the importance of challenging the authority of scientific expertise in occasions where experiential knowledge could provide valuable viewpoints (Roedema et al., 2021b). In the following example, you read about a science communicator from Poland. He facilitates dialogue sessions between scientific experts and citizens, where the experts were challenged every time they made a claim on the basis of their scientific authority and without using scientific arguments.

...so now

"I understand now, that I have to explain and substantiate where your argument comes from. People trust authority. We need to be aware of this and act responsibly. It is not enough to say something is true 'because you are the expert'. You have to explain your argument in terms of 'why' something is true, and 'why' you think this is true. In my communication activities, when I did this, there was a lot of laughter, a lot of self- criticism. That kind of broke the ice. People feel really comfortable when you tear down the wall that separates scientific experts from citizens."



VIRTUE 2

Critically reflect on your assumptions and worldviews

Due to digitalisation and the rise of social media channels there is an abundance of scientific information available to anyone who has internet access. This has resulted in a society wherein different perspectives on scientific facts are openly voiced and disputed online and that polarisation around scientific topics have become more explicit. Communicating scientists and science communicators are increasingly confronted with science sceptics who have 'opinions' about scientific information and who believe that scientific facts are not 'universal truths'. This leads to many science communicators still falling into the 'knowledge-deficit trap'. Their typical response to science sceptics is to explain the scientific facts one more time. At the same time, we know that people make sense of science on the basis of their personal situation and social context, which includes people's values, emotions, worldviews, their surrounding community and culture, and economic position (Rerimassie et al., 2021).

It is important to challenge these persistent thoughts about audiences and the way in which these perspectives towards science and audiences influence how we practice science communication.

What assumptions do I make about my audience?

What am I not seeing?

With whom am I not interacting?

Should I engage them differently?

And how can I transform my practice, so that I can connect to the personal and contextual notions that people have towards science?

Our Rethinkerspace members challenged their assumptions about audiences, and subsequently, tinkered with their daily practice accordingly (Roedema et al., 2021b). They found how suspending judgement, being open about their personal reflections and emotions in science communication outputs - next to merely presenting scientific facts -, and listening, had enriched the interactions they had with audiences.

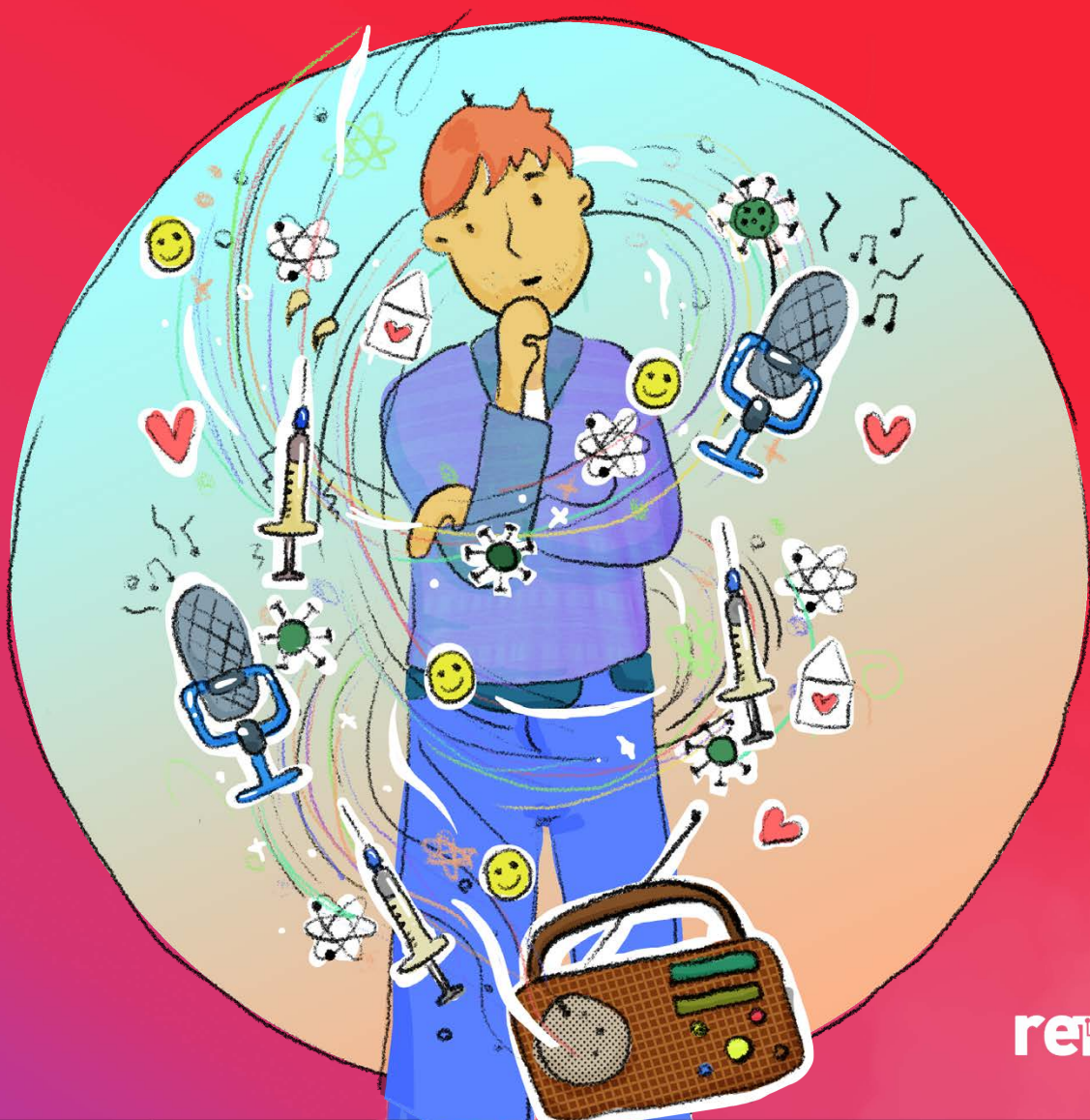
Take a look at the following example from an immunologist who took part in developing a reflective practice. He has been a frequent guest at a radio show during the Covid-19 pandemic. He reflected a lot about who he wanted to reach with his communication activities, and came to the conclusion that he predominantly wanted to convince anti-vaxxers that getting vaccinated is essential for society to get through the pandemic sooner.

"Before the pandemic, I saw the anti-vax movement as a committed community, but a minority in society. I thought that their beliefs were spreading, but I didn't at all think they were mainstream. As an immunologist I found these views slightly infuriating in the face of a monumental amount of scientific data, showing that vaccines work and that they are safe."

But now...

"Reflecting on where I come from, on my own worldview and perspective on science, ensures that I am more empathetic to people's valid concerns, without pandering to the extreme conspiracies. I think it is better to assume that your "invisible" audience does have concerns and attempt to address those (imagined) concerns, rather than just bombarding them with more facts about vaccines."

I still feel deeply frustrated by extreme anti-vax views, but I am far more understanding of the underlying emotions and personal situations of people. This insight helps me with deploying a different approach to my communication practice. I think if someone is on the fence about vaccines, then approaching them empathetically is absolutely crucial. Some scientists and scicommers risk further polarising people towards anti-vax views. I think it's really harmful to just tell people that they are wrong, and throw facts and judgement at them."



VIRTUE 3

Open-up your own mind to a multitude of perspectives on science...

The Covid-19 pandemic has made explicit that many different values, beliefs, worldviews, emotions and perspectives co-exist with regards to science. This also means that the practice of science communication is more than just writing popular scientific articles with what scientific information can be transmitted from the scientific community to society. Instead, it is important that science communication practitioners adopt an open and reflective practice that helps citizens make sense of the information that is brought to them.

Not only is it important that science communication practitioners are open and respectful to a wide range of evidence, sources, new information and perspectives; by displaying such an attitude it also helps receivers of such communication practices to engage with these outputs in an open and respectful way.

Therefore, making explicit the broad range of perspectives, also when those might counter your own perspective or beliefs, is important. Being prepared to revise perspectives and actions based on new information and insights helps others to 'plunge into the deep', and be more willing to change their mind in light of other perspectives and new information as well.

The following example showcases how a communicating scientist with her own podcast came to the realisation that she had blindspots in the many perspectives that exist with regards to scientific information.

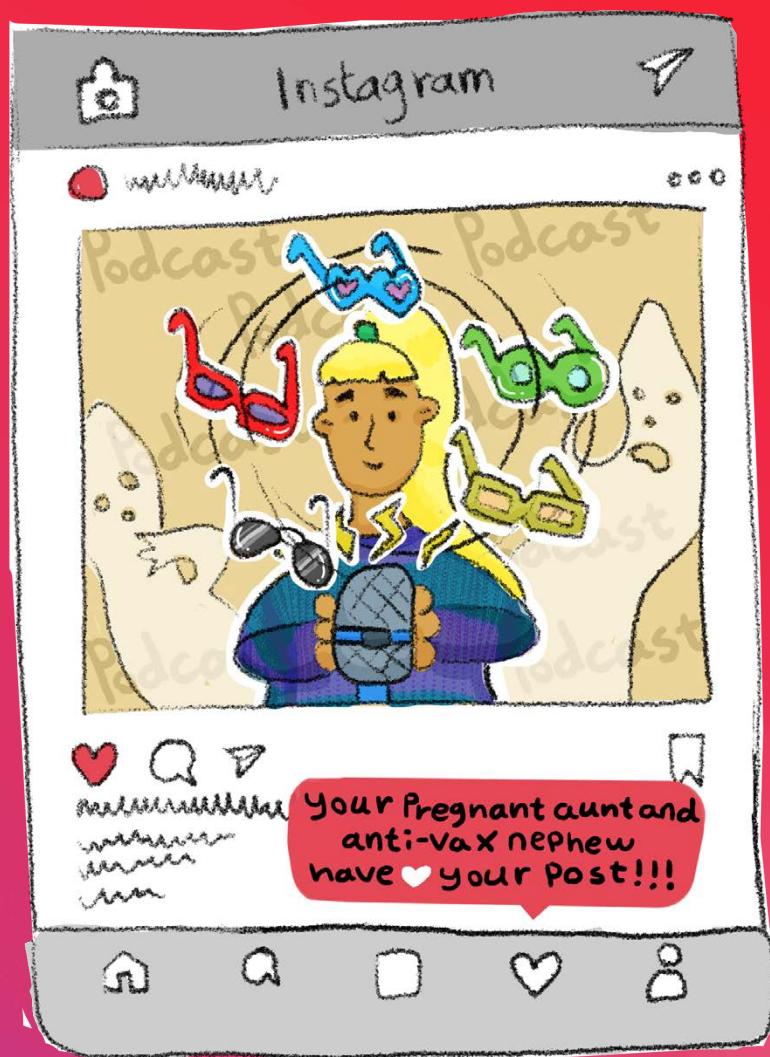
Together with the listeners of her show, and friends and family members, she tried to gather as many different perspectives as she could find, and discussed them openly in her podcast. Specifically, it is interesting to read how she created space for emotions and the personal situations of pregnant women to enter the conversation about Covid-19 vaccines. Opening-up about the many different perspectives 'out there', helped her to engage with her audiences in a new way.

...and make these explicit in your science communication output and activities

"Previously, I did acknowledge that there is an infertility anti-vax rumour going around, but I always immediately mentioned that there is absolutely no evidence to support that. When I took part in the reflective practice experiments, I decided to send around a short questionnaire via Instagram. I asked my audience what they thought of the podcast, how it made them feel. I got a lot of responses from pregnant women who were terrified of the information I put out, even when I mentioned vaccines were safe to them. I realised that the topic itself made them anxious."

...and now

"I try to not go straight to the scientific information and first acknowledge the fear people might have. And then the reasons for how and why certain conspiracies about vaccines and infertility emerge. I could have easily been dismissive of vaccine hesitant people and let my emotions lead the discussion, whereas now that I have opened-up my mind to more perspectives on science, I always try to approach my practice from a more emotional point of departure. The frustration that many scientists and science communicators feel, bleed out into the interaction. I think that risks further alienating the audience from science".



VIRTUE 4

Listen, find common ground, and focus on the personal and relational aspect of ‘doing’ science communication

When confronted with people that have very different worldview, emotions, and values regarding scientific information compared to your own perspective, it is very easy to become dismissive of their opinions. We close our ears and close our minds. It makes us not listen anymore to the - often personal, experiential or emotional - reasons that lay underneath people's words. It shuts down our curiosity to learn where the other is coming from. Listening in communication activities, therefore, sounds easier said than done.

By showcasing the following example of a PhD candidate who works for the faculty of Religion and Theology, we want to make the case for sparking your curiosity in the other. Why is this happening, why is this person saying these things? Why do they act in this way, and why do I respond to them the way I do? By trying to suspend your initial closing off, and by engaging in an interaction wherein you try to figure out the answers to these questions together, you might find that you actually have more in common with ‘the other’ than you would think at first.

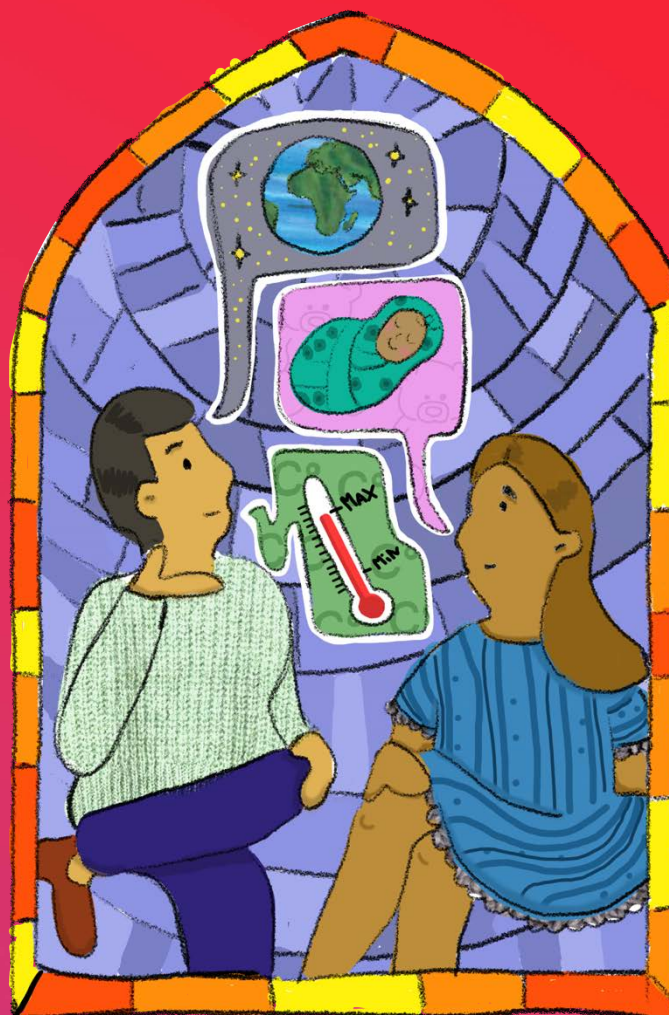
The research group this PhD candidate works for, has the primary goal of reaching underserved and hard-to-reach audiences. Her research focuses on how to bridge the seemingly different worlds of science and religion. In her conversations, she always tries to search for common ground with people who have different worldviews, experiences and values, regarding science.

Interestingly, with such an approach, this communicating scientist could shift the conversation from disagreeing about the scientific facts, to a conversation wherein both parties listen to what the other is really telling them. In such a process, it is more easy to find common ground, and come to what are the important underlying values at stake, the diversity of perspective on where to seek for solutions, and the implications of science to people's daily life - next to disagreeing about whether the scientific information on the table is true or not.

"Part of my own research is also to simply map out where people's concerns lie or originate from. What keeps them busy? Where do the doubts come from? An important first step for me is to always listen, to suspend my judgement and to map out their scepticism? There is always something surprising underneath, that I can relate to myself" .

...and now

"For example, I have a child, I am a mother. I firmly believe that climate change is real. But when I talk to a climate sceptic, I can relate to the worry about the future of my child. It helps me to start the conversation in that way, so not primarily from my role as an academic, but as a concerned mother. What about the future? How should we make sure, together, that no one worries? Not only the climate sceptical person about, for example, changing society too fast, but also my concern, that we do not change fast enough? In such a conversation, we can find common ground - that you often have with other people. Only then can you put science back on the table."



VIRTUE 5

Humility: Acknowledge the limits of knowledge and embrace uncertainty

We live in uncertain times. Citizens had to make sense of the risks of the pandemic and the impact of measurements for their daily life, and at the same time, were overwhelmed with scientific information. Often, this information was incomplete, not fitting for the personal situation people found themselves in, ambiguous and sometimes even contradicting. On top of this, online and in the public discourse an increased influx of misinformation was experienced - which made it hard for people to establish what information was true and what not. The prevailing complexities and uncertainty that became explicit in the pandemic have made it enormously difficult for citizens to come to terms with this new reality (Rerimassie, 2021).

"I had a moment of confusion when in the beginning they said that masks were not obligatory and that masks wouldn't help. Then, from one day to the next, they said 'ok masks actually help'. Did they know before? What happened there? What should I do now?"

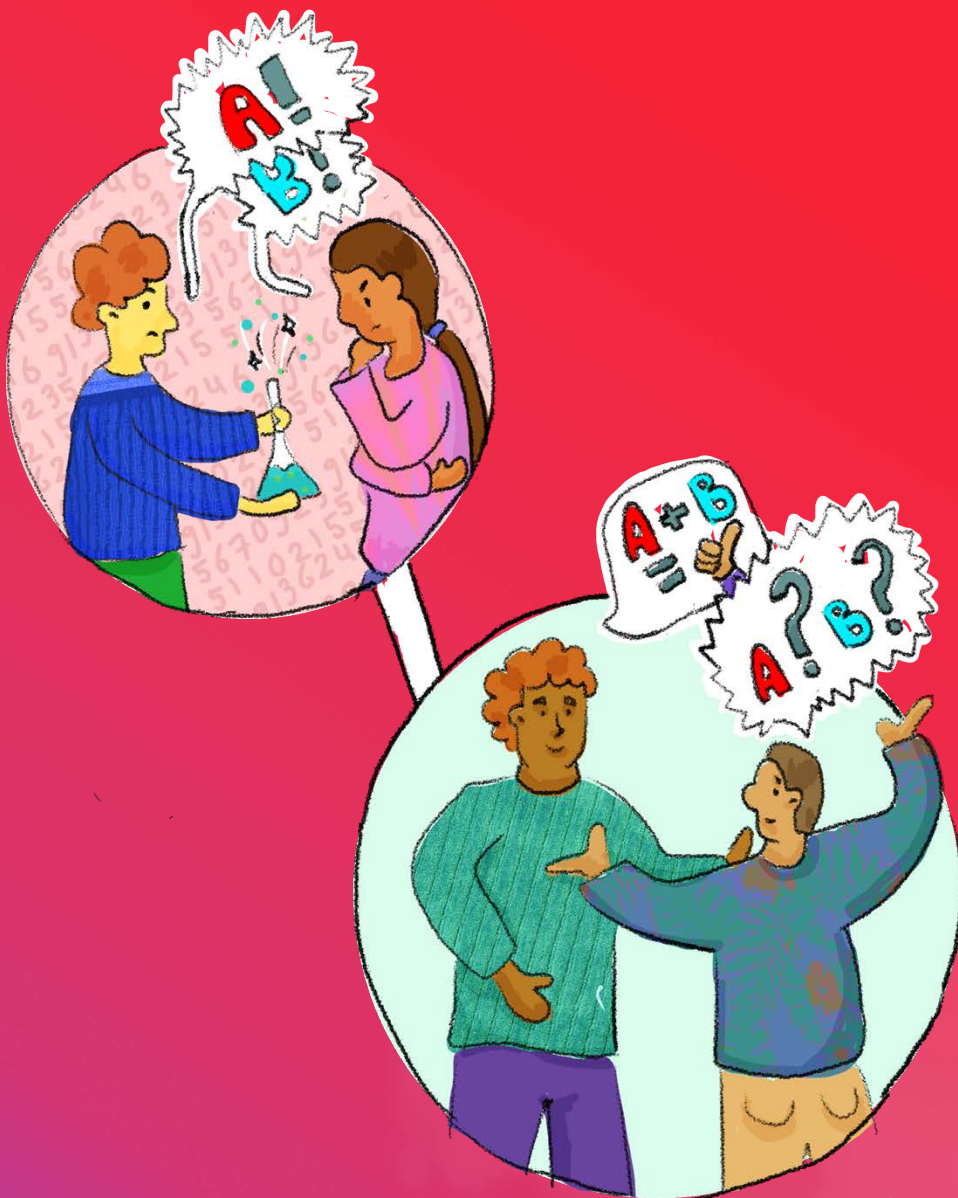
Many science communication practitioners have responded to this experienced uncertainty about scientific information by providing even more information, displaying a degree of certainty that was often immediately questioned in public. Journalists and other science communicators often find it difficult to communicate uncertainty, and therefore tend to ignore it in their science communication outputs. But does providing this type of certainty provide us with feelings of relief?

The RETHINK project has identified embracing uncertainties as a point of strength that should be addressed, rather than a weakness that should be avoided in public conversations on science. We need science communication practices that allow for open conversations on the ambiguities, uncertainties and complexities inherent to science and the scientific practice, and with a wide diversity of publics (Jasanoff, 2003). Herein, it is important to be open about the limits and boundaries of science, and help audiences embrace and cope with uncertainty - instead of pretending that uncertainty does not exist.

What helps is acknowledging that uncertainty exists, focusing on the underlying values and perspectives present and shifting the attention to the process of science by displaying how they deal with inevitable uncertainties (Kupper, Spokes magazine article). Our Rethinkerspace member from Serbia, who works as a communications manager at a research institute, described how he discusses these notions of uncertainty, the limits of scientific knowledge, and the process of science as follows:

...and now

"The pandemic has shown that people are being totally freaked-out that scientists have different opinions. They think: 'Why do scientists say different things?!' But, this is the scientific process. That you try some things, you find evidence for your hypothesis, or that you have to try something else and find new evidence".



VIRTUE 6

What if...

You created science communication output together with your audience?

Many science communication practitioners mention the difficulty of communicating to an audience that is unknown. Online, people are nothing but profile pictures and a tag, but really knowing what these people need from science or science communication outputs is hard to find out. This leaves many science communicators to question if their output actually reaches their audience and if it has the intended effect.

A solution here can be to create your science communication output together with your audience. This can be done in many ways, for example, simply by writing an article together with the audience you aim to reach, by asking your audience to provide input to the list of questions you want to ask an expert of your radio show, or by sending out questionnaires that asks for feedback on the output you have send out. By creating something together, your own perspective and that of 'the other' is constantly challenged and addressed in the moment. This makes the science communication output more attentive to change accordingly to what different audiences and different situations require.

What would happen if you would co-produce your science communication activity or output together with an audience that is unknown to you, or that you struggle to reach? Instinctively, it is not hard to imagine that the output would include a different tone and language. That you are confronted with using jargon, slang, or voicing an assumption you did not know you had, in making the product. In short, it is a way to get to know the audience you want to reach, and at the same time align your perspective and practice to what this audience requires. It is an opportunity to make your own work more diverse and attentive to diversity, ambiguities, uncertainty, differing perspectives and conflict, present in your audience and in society.



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