

Understanding How Citizens Make Sense of Science

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Question in focus

How do 'lay' audiences understand, perceive and interpret science communication in their everyday practice?

Empirical approach

- 81 semi-structured interviews in seven European countries to analyse sensemaking practices
- Workshops with researchers and science communicators to develop strategies to open up sensemaking

Core findings

- 'Gaps' in dealing with science-related information take the form of uncertainty and ambiguity
- Personal situation and context have a large influence on the use of and trust in sources that help to build 'bridges' to overcome sensemaking gaps

Future directions

- Develop strategies to apply sensemaking as an approach to understand and adapt citizens' perspectives in science communication

Objectives and Approach

The second theme of our research was to learn about the challenges that occur at the science–society interface and to shed light on the consequences for science communication. These challenges become especially visible in the context of citizens' sensemaking and thus require closer attention. We used the case of the COVID-19 pandemic, which presents a dramatic but valuable example to investigate the sensemaking practices of citizens across Europe. The pandemic has been difficult to manage and endure, as it is continuously surrounded by complexity and uncertainty and involves fundamental medical, political, societal, economic and ethical issues. Numerous media and other actors are continuously reporting on COVID-19, often highlighting widely differing viewpoints. This situation raises difficult questions for citizens: Which information is true, flawed or even false? Which actors can be trusted to determine what is true? Will containment measures be effective, and are such measures proportional and legitimate? Indeed, the

prevailing complexity and uncertainty of the COVID-19 crisis have made it extremely challenging for citizens to come to terms with this new reality. Against this backdrop, the sensemaking approach was considered especially useful as it makes the perspective of the participant (or sensemaker) central to the public discussion, and it, takes the study of an individual's situation as a starting point.

Our goal was to show the diversity of mechanisms that play a role in citizen sensemaking practices using an example of an issue in which the connections between science and society have been brought into sharp view. To understand how citizens make sense of (science) communication related to COVID-19, we conducted 81 in-depth interviews with citizens during the first wave of the pandemic. Participants came from eight European countries: Germany, Italy, the Netherlands, Poland, Portugal, Serbia, Sweden and the United Kingdom. To understand different sensemaking practices, the objective was to interview people who were as diverse as possible (e.g., regarding family status, occupation, age, gender, societal engagement and political attitudes).

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Sensemaking as an approach to re-searching citizens' perceptions of science communication

Sensemaking is the process through which people create an understanding of situations in which they find themselves (Fiss & Hirsch, 2005; P. Zhang & Soergel, 2014). Broadly defined, this process consists of two phases: 1) seeking and filtering information, also called sensing, and 2) actual sensemaking, in which an understanding of the information is established by relating to existing structures and previous experience (Y. Zhang et al., 2019). The sense-making approach starts from the assumption that information is never complete, implying that people are always capable of finding a way to accommodate for diversity, complexity and incompleteness in information (Dervin, 1998).

The sensemaking methodology is built around the idea that when individuals are confronted with a complex, ambiguous issue relating to science, they are faced with a gap. To 'fill' this gap, people use and reject previous and actual information and knowledge to build bridges over the gaps. This bridge building is influenced by people's individual situations and contexts. Eventually, this leads to an outcome in which a momentary understanding of the particular issue is formulated (Dervin, 1998). However, this sensemaking is always constrained; the perception of reality is neither complete nor constant, but new gaps continuously appear and need to be filled and bridged. Accordingly, sensemaking is not stable but develops over time as a continuous process (Dervin, 1998).

Following the sensemaking methodology (Dervin, 2008), we explored how citizens made sense of so-called micro-moments: specific moments in which they stumbled upon questions and uncertainties related to the pandemic.

Personal situation trumps information

The findings of the interview study emphasise the influence of the personal situation for making sense of science communication. In the case of COVID-19, own affectedness (e.g., own sickness), perceived vulnerability (e.g., series of relatives who became sick) and social context (e.g., professional background, influence of family and friends) had a fundamental impact on the understanding of the pandemic and

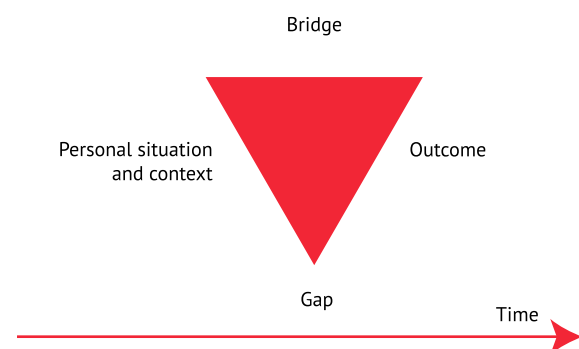


Fig. 1: Micro-moment triangle that illustrates the five dimensions of the sensemaking process as represented in the SMM (Sense Making Methodology; modelled after Reinhard & Dervin, 2012).

related (science) communication. Interviews showed that the personal situation shaped the perceived gaps and the bridging strategies employed to a large extent. Further, the outcomes reached often mirrored one's personal situation. For the practice of science communication, it is a sobering insight that the personal situation can outweigh information and insights provided by science communicators.

Understanding the unknown

Moreover, the nature of recurring gaps and how these gaps become apparent was an important question. The findings indicate that gaps can be grouped into two overarching categories: fundamental uncertainties and ambiguities. Starting with the uncertainties, participants had numerous questions about the nature, characteristics and origin of the virus. How does it transfer? How harmful is it? How did it originate, and what impact will it eventually have? Ambiguities refer to expressed doubts and worries about the appropriate response to the pandemic, notably from the government. In short, from a societal perspective, interviewees worried whether the cure (political regulations such as lockdowns) might be worse than the disease and its consequences. When looking at how gaps emerge, the two most important sources were being confronted with (an abundance of) information, notably in the case of changing and contradicting information and policies, and interactions with others. Particularly relevant for science communication is the observation that given the uncertainties concerning the virus and the pandemic, participants were continuously

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confronted with new information that, in turn, often raised new questions. Moreover, participants found contradictory information one of the most frustrating issues when trying to make sense of the pandemic. Next, interaction with others was prone to reveal gaps. Interaction with others was understood as (direct) personal contact but also observing the behaviour and choices of others. Such interactions often revealed gaps regarding what level of cautious behaviour was adequate (e.g., with regard to social distancing).

Bridging strategies and sources

Looking at the bridges that the participants – explicitly or implicitly – constructed, we identified different elements that play a dominant role in citizens' sensemaking practices. These were different worldviews, the use of information and different (predominantly negative) emotions. First of all, we saw that participants upheld different *a priori* beliefs and ideas about institutions (e.g., society, the government, experts and the media) which we clustered under the heading of worldviews. These were also related to different levels of trust in the aforementioned institutions. One cluster of participants demonstrated an *a priori* trust in institutions (notably [health] authorities and the media), while others distrusted these institutions from the outset. This directly influenced the participants' assessment of the reliability of information provided by these institutions. Still, many participants made use of information to bridge gaps; this included passively received information. Some participants actively looked up information in relation to the gaps they were facing. However, direct reference to dedicated science communication outlets was limited, while personal information (e.g., from friends and family) seemed more important. Lastly, emotions played a very important role in sensemaking practices related to COVID-19. The results clearly indicated that citizens experienced a multitude of emotions regarding the pandemic. These were mostly negative: anxiety, anger and frustration played a fundamental role in reaching certain outcomes. Occasionally participants explicitly referred to positive emotions that provided leverage to make the situation manageable.

Outlook: Developing strategies for science communicators to open up sense-making

This study revealed important opportunities for improving science–society interactions and as such provides important learning opportunities for the practice of science communication. A better understanding of sensemaking practices can enable the formulation of science communication strategies tailored to various sensemaking styles and local contexts and communities, with the overarching aim to contribute to a constructive public dialogue on science. We believe that insights into the values, worldviews and emotions that citizens have when they make sense of science can help science communicators to establish meaningful interactions, wherein mutual trust and understanding is facilitated. Insights into sensemaking processes can help science communicators to adopt practices that connect to various sensemaking practices. Such science communication practices are necessarily focused on opening up the sensemaking practices of citizens, as this facilitates science communicators to connect to citizens' underlying values, emotions and worldviews on science.

Therefore, we suggest that science communicators in the future develop reflective practices (Roedema et al., forthcoming). For instance, science communicators could explore the sensemaking practices that they encounter in their audience and at the same time reflect on their own actions and approach in reaching out to these audiences (Roedema et al., forthcoming; Schön, 1983). This might be especially important in online interactions, where differing opinions and worldviews have become more numerous and explicit.

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Recommended readings

On reflective practice and sensemaking:

Chilvers, J. (2012). Reflexive Engagement? Actors, Learning and Reflexivity in Public Dialogue on Science and Technology. *Science Communication*, 35(3), 283-310.

Ridgway, A., Milani, E., Wilkinson, C., & Weitkamp, E. (2020). *Report on the Barriers and Opportunities for Opening Up Sensemaking Practices*. European Commission deliverable report. https://www.rethinkscicomm.eu/wp-content/uploads/2020/12/D2.3-RETHINK_Derivable.pdf.

Roedema, T., Streekstra, K., Berendrecht, E., de Vries, Y., Ramaaker, E., Schoute, K., Rerimassie, V., & Kupper, F. (2021). *Strategies towards a reflective practice for science communicators in order to open-up sensemaking practices of citizens*. European Commission deliverable report. https://www.rethinkscicomm.eu/wp-content/uploads/2021/07/RETHINK_D2.4_Report-on-the-effectiveness-of-engagement-strategies-to-enhance-openness-and-reflexivity-3.pdf

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Schön, D. (1983). *The reflective practitioner: How professionals think in action*. Routledge.

Zhang, P., & Soergel, D. (2014). Towards a Comprehensive Model of the Cognitive Process and Mechanisms of Individual Sensemaking. *Journal of the Association for Information Science and Technology*, 65, 1733-1756. <https://doi.org/10.1002/asi.23125>

Zhang, Y., Lu, T., Phang, C. W., & Zhang, C. (2019). Scientific Knowledge Communication in Online Q&A Communities: Linguistic Devices as a Tool to Increase the Popularity and Perceived Professionalism of Knowledge Contributions. *Journal of the Association for Information Systems*, 20(8), 1129–1173. <https://doi.org/10.17705/1jais.00563>

References

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Dervin, B. (2008). Interviewing as dialectical practice: *SenseMaking Methodology as exemplar*. Paper presented at the International Association for Media and Communication Research Annual Meeting, Sweden.

Fiss, P. C., & Hirsch, P. M. (2005). The Discourse of Globalization: Framing and Sensemaking of an Emerging Concept. *American Sociological Review*, 70(1), 29–52. <https://doi.org/10.1177/000312240507000103>

Reinhard, C. D., & Dervin, B. (2012). Comparing situated sense-making processes in virtual worlds: Application of Dervin's Sense-Making Methodology to media reception situations. *Convergence*, 18(1), 27–48. <https://doi.org/10.1177/1354856511419914>

Rerimassie, V., Roedema, T., Augustijn, L., Schirmer, A., & Kupper, F. (2021). *Making sense of the COVID-19 pandemic: An analysis of the dynamics of citizen sensemaking practices*