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Editorial: Rethinking the role of (scientific) knowledge in climate communication

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Editorial on the Research Topic

[Rethinking the role of \(scientific\) knowledge in climate communication](#)

Motivation

In climate communication research, knowledge has come under much critical scrutiny ever since numerous empirical studies demonstrated that it has very little to no effect on behavioral changes (Kollmuss and Agyeman, 2002; Taddicken et al., 2018; Poortinga et al., 2019) and is not mono-causally linked to pro-environmental attitudes (Allum et al., 2008). So why does knowledge still hold such significance in research on climate communication? With this Research Topic, we want to inspire the rethinking of the role of (scientific) knowledge in climate communication at the intersection of science communication and climate communication. We aim for an interdisciplinary reflection on climate change-related knowledge processes, theoretical models and empirical research as addressed by four articles in this Research Topic.

Many of the empirical studies in the research field define knowledge as a cognitive resource or as a cognitive component, mainly produced in the scientific sphere (Taddicken et al., 2018). For example, in the tradition of quantitative survey studies, knowledge is often measured against the IPCC consensus, seeking to ensure that the knowledge collected is not only accurate and relevant but also publicly accessible in order to be applicable (Oschatz et al., 2019). Alternatively, qualitative approaches often emphasize the importance of better understanding of how individuals select and construct knowledge, and apply it in their daily lives; a perspective stemming from fields such as Human Geography (Ryghaug et al., 2011; Kessler and Rau, 2023). Complementing those findings from various traditions within social science research, the results from the natural sciences seem to support the “knowledge-action-gap” hypothesis that despite widespread and growing public awareness about the threats posed by climate change [as evidenced by e.g., [Special Eurobarometer 538, 2023](#), global CO₂ emissions continue unabated [Global Carbon Project, 2023](#)]. Accordingly, Kessler and Rau (2023) point out that the “knowledge-action-gap” should not be understood as an unusual deviation from the norm, but instead as the standard situation for various contexts relating to everyday life.

Accordingly, paradigms such as the knowledge deficit model (Royal Society, 1985) or the theory of planned behavior (TPB) (Ajzen, 1985) have been widely questioned for assuming linear relationships and for being technocratic and unable to explain the (in-)action toward climate mitigation, adaptation and transformation (e.g., Kahlor and Rosenthal, 2009). Similarly for the science-policy interface, the truth-to-power model (Wildavsky, 1979) has been criticized for black-and-white thinking because it ignores the importance of values, beliefs, identities and system-inherent logics in politics (Faehnrich and Ruser, 2019; Donadelli and Gregory, 2022). A normative critique points to another risk of focusing on knowledge, namely that it goes hand-in-hand with the omnipresence of scientific expertise in public discourses.

From a communication scholars' perspective, an omnipresence of scientific expertise could have another unintended side-effect, namely to hinder engagement and empowerment of wider audiences, as the emphasis is on "elite" scientific and technological knowledge which could popularize technocratic approaches and strengthen a popular "laid back" position (e.g., waiting for the next 10-years study, also discussed as "discourse of delay", Lamb et al., 2020). Insofar as epistemic authority (Raviv et al., 1993) regarding climate change is fully devolved to science and scientific actors, this risks making climate change less of a deep human concern but rather a "technical" one invested in those elites who are able to speak the language of science (Donadelli and Gregory, 2022). Instead, Hulme (2009) recommends that we culturally reflect on the relationship between nature and humanity more thoroughly. For example, local ecological knowledge (LEK) and traditional ecological knowledge (TEK) have been identified as very relevant forms of knowledge for both: producing and communicating science (Reyes-García et al., 2020). Another learning from the critique on the "knowledge-action-gap" and prominent views among climate communication practitioners is to proceed "from knowledge to action" (Defila et al., 2012), stressing that social action—e.g., behavioral change—is the key goal, rather than knowledge (e.g., see Sippel et al., 2022).

In summary: The concept of Western oriented, scientific and science-related knowledge as a kind of universal superpower for climate communication is broadly questioned—empirically, theoretically and normatively.

But while the limitations of the classical concept of knowledge as the precursor to action for the field of climate communication seem evident, there is a growing interest in the research field and the practice of science communication (e.g., see the rise of initiatives, networks and research programs to foster them; Leßmöllmann et al., 2020). Ongoing trends such as science slams, TED Talks and art-meets-science exhibitions are founded on the assumption that many publics are fascinated by science and its powerful ways of creating and showcasing scientific knowledge. Organizations such as Science Media Centers (see Rödder, 2015) rely on the importance and relevance of scientific knowledge for journalism and, relatedly, for a collection of sub-systems in modern societies. Current crises such as the COVID-19 pandemic seem to demonstrate the importance of evidence-based science communication in practice (Weingart et al., 2022; Gerber, 2023), even though the concept has its limitations.

So while there are huge criticisms on climate communication placing scientific knowledge at the forefront, scientific knowledge and scientific expertise are seen as valuable resources for modern societies to better understand risks, threats and windows of opportunities. In journalistic media, scientific knowledge about climate change is prevalent and available for many audiences and decision-makers, based on authoritative sources such as IPCC (Intergovernmental Panel on Climate Change) reports (Schäfer et al., 2014). Due to these scientific or science-related drivers of public opinion—and, thus, the representation of scientific knowledge—climate change is one of the most prominent science topics in media coverage worldwide and has contributed to a high awareness level of climate change among publics, especially in industrialized countries (Schmidt et al., 2013).

For science communication research, the analysis of misinformation and science denial (Walter et al., 2018) needs a clear definition of the respective counterpart—namely information, knowledge and consensus, to be able to distinguish misinformation from "information". And how could a "false balance" (Boykoff and Boykoff, 2004) of climate reporting have been revealed without the reference to the consensus of scientific knowledge? So, despite the critiques of theoretical models which place knowledge at the center of their assumptions, many climate communication research and practices broadly rely on it.

Science communication practices cited above often thrive in public spheres for people seeking a blend of (cognitive) information and (affective) entertainment, indicating a different understanding of how to deliver scientific knowledge, with the underlying assumption that information is at odds with entertainment and insufficient on its own (see Früh et al., 1996; Klaus, 2008; Ritterfeld et al., 2009; Bilandzic and Blessing, 2022). Following this separation, attempts are made to "package knowledge" with entertainment strategies—to hide knowledge like medicine in a spoonful of sugar. But perhaps it's not about the "bitter knowledge" at all, but rather about linearity, overwhelming complexity of information, and a "patronizing attitude" of communicators. Indeed, there is a major paradigm shift in science communication, which has transitioned from traditional linear models focused on information transfer to more participatory and dialogue-centered methods (Nisbet and Scheufele, 2009). So maybe knowledge does not need to be hidden at all, but rather integrated gradually, interactively as part of a more dialogue-oriented communication. In dialogue-oriented science communication, research has identified key characteristics, primarily emphasizing the mutual exchange of meanings and perspectives. For instance, in public and online dialogues, scientists are expected not only to disseminate information but also to actively listen and understand other perspectives: "Science communication based on the dialogue model—also referred to as public engagement with science—foregrounds a two-way flow of information (...). A key feature is mutual learning (...). The dialogue model explicitly acknowledges different forms of knowledge, scientists and non-experts have equal status, and together they are expected to learn with and from each other." (Reincke et al., 2020, p. 2). With this quote, it becomes evident that other forms of knowledge, distinct from Western-oriented scientific knowledge, are much more valued than in previous models of science communication. This line of thought has been further

developed, with intensive deliberation on transdisciplinarity and the integration of plural perspectives into the production of scientific knowledge itself (Kurath and Gisler, 2009; Harris et al., 2010). For the realm of communicating about climate change, this new richness adds another layer and one could ask: Which knowledge receives communicative attention, is deemed effective for transformation? And could these collectively negotiated pools of knowledge potentially make a decisive difference in communication and in moving “from knowledge to action?” How to empirically cope with the joint production and negotiation of knowledge in non-linear communication? This has been the starting point of this Research Topic that is a collection of four articles.

Pathways of the articles in this Research Topic

To shed a critical light on the question of how knowledge is defined and understood in climate communication research, Page-Butler discusses how strongly knowledge and values are interconnected and pleads that the two concepts should not be understood as independent from each other. Consistent with this approach, she demonstrates the importance of social media data in getting a closer look at the connection between knowledge and values in people’s everyday understanding of the world. Page-Butler recommends not focusing on the knowledge of epistemic authorities from the scientific sphere and on how far this is “understood” by “lay audiences”, but on examining the knowledge of people from their perspective—and better understanding how their values are closely interrelated with knowledge, acting, for example, as the selective lens.

Based on the conceptual distinction between awareness-knowledge and principles-knowledge, Arlt et al. identify relevant facts about the energy transition within a trans- and interdisciplinary project and explore the knowledge levels of Germans. The question of how exposure to issue-related journalistic media content and direct information from scientists or other relevant agents engaged in the energy transition is associated with people’s knowledge levels is at the heart of the survey study. The authors show that public knowledge of changes in the energy system and of hydrogen is very limited thus far. Furthermore, received information has only a limited influence on people’s engagement with the issue.

Soßdorf and Burgi focus on activists as alternative science communicators and agents of change and propose a theoretical framework that includes why and how scientific knowledge is used by climate movements as legitimation. Based on this framework, the authors present findings from a survey among activists of the *Fridays for Future* movement and show the high relevance of scientific information for strategic use inside the movement, and in the movement’s general communication. They show how climate science knowledge serves as a moral resource and source of legitimacy for the movement.

Hinks and Rödder explore the relationship between scientific knowledge and the social movement *Extinction Rebellion*, asking “(i) how does the movement *Extinction Rebellion* present science in their narrative and (ii)

how does this resonate with their constructions of climate futures?” For the first research question, the fundamental role of scientific knowledge for the rhetoric of the movement becomes clear: “telling the truth” is a central theme in all analyzed press releases. Thus, the research of Hinks and Rödder shows the importance of “epistemic and cultural authorities” (p. 12) in providing well-accepted “knowledge” for actors such as social movements, so that they in turn can refer to this authority in public discourses—for example, in the form of “wake-up-calls” designed to enlighten societies.

In these four articles, the authors consider a variety of knowledge types and knowledge contexts that involve diverse agents and their specific roles in the knowledge process. Page-Butler and Arlt et al. focus on the public’s knowledge and highlight the relevance of online media use as a key factor to consider. Hinks and Rödder and Soßdorf and Burgi look at the climate activists and the role of scientific knowledge in their strategic communication. Arlt et al. consider most of the agents potentially involved in the knowledge process by exploring the link between information provided by journalistic media as well as political, scientific, economic and environmental agents and the level of public knowledge. The articles reflect particularly on the authority of science in the knowledge hierarchy in generating and providing “true” and “morally correct” knowledge.

This Research Topic thus covers a range of different social scientific methods and qualitative and quantitative approaches in order to advance research. A theoretical contribution discusses the position and role from which knowledge is defined and understood (Page-Butler). A survey study analyses how much Germans know about energy transitions and how little this knowledge can be explained by media usage (Arlt et al.; Soßdorf and Burgi). The article by Hinks and Rödder applies a mix of qualitative methods that combines the analysis of press releases, observations and interviews with environmental activists during a UN climate summit. As such, they collected their data at a venue where the sovereignty of interpretation is negotiated. Overall, the Research Topic highlights the values of qualitative as well as quantitative empirical research on climate change-related knowledge.

Continuing challenges for climate communication research

It is evidently clear that four manuscripts alone cannot fulfill the comprehensive research requirements. Further research is needed which has to consider additional challenges: Many voices have raised concerns that a focus on mainly natural science-based knowledge pushes more culturally diverse approaches in the background (often related to the social sciences and humanities) to defining knowledge and exploring new ways of dealing with climate change and finding new pathways for sustainable development (Hulme, 2009). Also, voices based in the humanities have raised concerns, for example, about the black-and-white opposition between knowledge and ignorance and propose studying the interrelation between values and knowledge, as values often act as gatekeepers for what is developed and accepted as “knowledge” (Pulkkinen et al., 2022).

The paradigm shift toward more dialogue-oriented forms of communication about climate change and its theoretical and empirical understanding inspires new research questions, as new intermediaries and communicators—such as social movements and small-scale initiatives—and more non-linear, artistic forms of communication—such as exhibitions—move into the center of interest. In digital media environments—predestined for dialogue-oriented communication—a growing abundance of misinformation (Lewandowsky et al., 2017) and opposing epistemic authorities create conflict, shifting knowledge back into the focus of research. Major buzzwords here are “epistemic crisis” and “the end of truth” (Neuberger et al., 2023). Especially in times of crises—such as the climate crisis—the questions as to which actors the public trusts and which knowledge is present in the public and the media outlets used, and which knowledge is absent, are highly germane.

The four articles in this Research Topic offer just a selection of research work at the intersection of science communication and climate communication. They indicate that the traditional concept of scientific knowledge has to be both enlarged and differentiated: Scientific knowledge is not just a box of wisdom, but is deeply bound up with values. It may be used as a tool and instrument for political activism and as a resource for morality. Obviously, these issues touch on another perspective which is prevalent in other fields of communication research: the topic of affects and emotions in the process of communication (Lünenborg and Maier, 2018; Taddicken and Reif, 2020). How do emotions and affects interrelate with the specific knowledge on climate change (Lidskog et al., 2020; Taddicken and Wolff, 2020)? After more than four decades of public discourse on climate change, the dimension of how emotions and affects link with climate change and climate politics has rarely been explored. On a more general level, the role of knowledge in the intersection of scientific and climate communication could be reflected in a sociocultural and philosophical context. Our Western concept of science, knowledge and communication is deeply rooted in the tradition of the philosophy of the Enlightenment, based on the dualisms of knowledge vs. emotion, reason (*Vernunft*) vs. emotion, objectivity vs. subjectivity. While moves to establish a “Second Enlightenment” have not prevailed so far, we could try to overcome these dualisms, and render oppositions and ambiguities fruitful when exploring scientific communication and climate communication.

Conclusion

In conclusion, the Research Topic, as encapsulated in four contributions and centered on the European context, underscores that despite valid critiques of the deficit model in climate communication, knowledge continues to be a pivotal variable, highlighting the necessity for further exploration and differentiation. Ultimately, one may question the fundamental purpose of climate communication, or science communication more broadly, if it does not center on scientific knowledge. For example, it is questionable what kind of knowledge is often considered as “low impact”. In public discourses, there is often a focus on knowledge that stems from the natural sciences, and accordingly on describing and analyzing environmental problems.

Another assumption is that social scientific and humanities-based knowledge pertaining to climate change (for example, on

the obstacles to and potential for transformation) has little impact simply because it is much less publicly visible. This point also applies to other knowledge producers, such as Indigenous peoples and many other social groups. In understanding what people make out of the knowledge disseminated in public discourses, emotions, values and identities are another crucial area of interest. Are emotions inimical to information? Conceptualizing the relationship between information and emotion has a long tradition in communication studies (e.g., Früh et al., 1996; Klaus, 2008; Ritterfeld et al., 2009; Bilandzic and Blessing, 2022), but is rarely brought to bear on the field of science communication and climate communication.

For communicating about climate change, the new richness in understanding knowledge as evolving in dialogue and participation adds another layer relevant for empirical research: Which knowledge forms and knowledge broker receive communicative attention? Which can be seen as effective for communication and transformation? And could collectively, inter- or transdisciplinary negotiated pools of knowledge potentially make a decisive difference in communication and to move “from knowledge to action?” Even while this Research Topic can only sketch very first ideas for answers on these questions, we see those as promising direction for new research in this field.

Author contributions

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Conflict of interest

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