

Creating space for reflection and dialogue

Examples of new modes of communication for empowering climate action

“The definition of insanity is doing the same thing over and over again but expecting different results.” This quote by Albert Einstein highlights our need for new formats of communication to address the knowledge-action gap regarding climate change and other sustainability challenges. This includes reflection, and communication spaces, as well as methods and approaches that can catalyze the emergence of transformative change and action. In this article we present and reflect on experiments we carried out at international climate negotiations and conferences.

Carolin Fraude , Thomas Bruhn , Dorota Stasiak, Christine Wamsler , Kathleen Mar ,
Niko Schöpke , Heike Schroeder , Mark Lawrence 

Creating space for reflection and dialogue. Examples of new modes of communication for empowering climate action
GAIA 30/3 (2021): 174–180 | **Keywords:** climate change, Conference of the Parties, paradigm shift, relationality, sustainable development, transformation, transformative science communication

Communication about climate change and sustainability has failed to drive the transformative change that is so urgently needed to face the impending climate emergency (see Trümper and Beck 2021, in this issue). Research emphasizes that rapid action is needed to limit global warming to 2° or even 1.5°C above preindustrial levels and that incremental change is not enough (IEA 2021, IPCC 2018). While COVID-19 induced travel restrictions have led to a modest reduction in emissions (a 7% decrease in 2020 compared to 2019), this is expected to have a negligible long-term impact on climate change. And it should be noted that during the same period, greenhouse gas concentrations continued to rise (UNEP 2020).

Following the formation of the Intergovernmental Panel on Climate Change in 1988, scientists have accumulated a substantial body of knowledge that is underpinning worldwide climate emergency declarations (IPCC 2018, Overland et al. 2020). Yet committed action lags behind (UNEP 2020). For example, *United Nations Climate Change Conferences*, seen as the poster child for current climate communication approaches, have been criticized for only focusing on providing data and information to

the public or decision-makers, but have proven insufficient to drive policy and behavior change (Ockwell 2009).

In recent years, scientists have paid increasing attention to communication modalities and interactions between scientists, policymakers and civil society, notably their transdisciplinary and co-creative potential (Nanz et al. 2017, Bruhn et al. 2019, Lawrence et al. forthcoming). Research on the communication culture at the *Conference of the Parties (COP)* to the United Nations Framework Convention on Climate Change (UNFCCC) found, for instance, that the current communication and negotiation culture fosters deeply-rooted distrust between different groups (Wamsler et al. 2020).

Against this background, our objective is to provide inspiration and guidance to those in search of new, transformative reflection and communication approaches (e.g., researchers, organizers and facilitators engaged in climate conferences, climate advocacy, climate policy and/or political participation processes). We use the term *transformative reflection and communication* to describe approaches that consider people's inner lives, in order to address socioecological crises through individual and cultur-

Dipl.-Erziehungswissenschaftlerin Carolin Fraude | +49 331 28822357 | carolin.fraude@iass-potsdam.de

Dr. Thomas Bruhn | thomas.bruhn@iass-potsdam.de

Dr. Dorota Stasiak | dorota.stasiak@iass-potsdam.de

Prof. Dr. Mark Lawrence | mark.lawrence@iass-potsdam.de

Dr. Kathleen Mar | kathleen.mar@iass-potsdam.de

all: Institute for Advanced Sustainability Studies e.V. (IASS) | Berliner Str. 130 | 14467 Potsdam | Germany

Prof. Dr. Christine Wamsler | Lund University Centre for Sustainability Studies | Lund | Sweden | christine.wamsler@lucsus.lu.se

Prof. Dr. Heike Schroeder | University of East Anglia | Tyndall Centre for Climate Change Research | School of International Development | Norwich | United Kingdom | h.schroeder@uea.ac.uk

Dr. Niko Schöpke | University of Freiburg | Institute of Environmental Social Sciences and Geography | Freiburg | Germany | niko.schaepke@ifp.uni-freiburg.de

© 2021 C. Fraude et al.; licensee oekom verlag. This Open Access article is published under the terms of the Creative Commons Attribution License CCBY 4.0 (<http://creativecommons.org/licenses/by/4.0>).
<https://doi.org/10.14512/gaia.30.3.9>
Received December 8, 2020; revised version accepted August 27, 2021 (double-blind peer review).

al transformation (Wamsler 2020). Our work is based on insights and research that show that people can be empowered, and that a shift in perspective can be achieved if scientific communication engages with their inner lives, notably their beliefs, values, worldviews, emotions and motivations (Creutzig et al. 2020, Brink et al. 2019, Grothmann 2018). This often disregarded dimension of transformation is said to have greatest leverage in driving change towards sustainability – not only when applied to individual agency, but also to groups in all sectors, including business and government and education (Woiwode et al. 2021, Wamsler 2020).

Transformative reflection and communication

Spaces that allow for experiential reflection and communication, and that are safe enough for disagreements or mistrust to surface and be addressed, can initiate change in a person's life and, ultimately, support cultural transformation (Pereira et al. 2020). Formats based on trust, openness and honesty, which foster a new communication culture, can support connectedness to oneself and others (Wamsler et al. 2020). In addition, we argue that such formats can enhance the perception and understanding of deeper, common concerns that underlie seemingly conflicting interests and can dissolve opposition and polarization. In a time of increasing social division, it is ever more important to strengthen a culture of communication that connects and generates understanding. In this context, we have developed experimental spaces and communication formats that allow for self-reflection and reciprocal dialogue among stakeholders.

In this article we present and reflect on three experimental spaces that were implemented in at COP25 in Madrid in 2019, the *K3 Congress on Climate change, communication and society* held in Karlsruhe in 2019, and a Symposium on *How to move from climate knowledge to climate action* held in Bremerhaven in 2020. We call these spaces experiments as they provide a framework for testing if and how transformative reflection and communication formats can be facilitated in a traditional conference setting, and with what results.

We begin by elaborating on the principles that form the basis for our experiments. We then reflect on the communication formats that were used, and the support that facilitators, scientists and other actors need to broaden their communicative repertoire. In particular, we discuss the mindset, skillset and toolset that actors need to be able to engage in new modes of reflection and communication. Finally, we present how our experiments were implemented and highlight lessons.

Design principles for creating new reflection and communication spaces

A key aspect of the design principles for transformative reflection and dialogue is to create safe communication spaces. An exper-

ience-based approach to science communication that engages with people's inner lives requires them to feel comfortable and safe enough to engage in conversations where they can express their true intentions, personal concerns and feelings (such as fears or doubts).

Our experiments drew upon several design principles that were selected from facilitation approaches and theories such as the *Art of Hosting*, the *Manifesto for Slow Thinking*, and *Transformative Learning* (Pogatschnigg 2021, Habermann et al. 2018, Mezirow 2009). Our experience of facilitating processes with similar stakeholders and tests of reflection and communication approaches during COP24 in Katowice led to the identification of four main principles. The descriptions in box 1 (p. 176) are the result of an iterative process of applying and experimenting with these principles.

Methods for activating transformative reflection and communication

In our experiments, trained facilitators selected specific methods and practices based on their professional experience in facilitation and process design, and the potential relevance and impact of these methods. Previous experience generally came from contexts of adult education, personal development, and leadership training. Facilitators could thus not be certain about how the different interventions would be received by their peers from the climate and sustainability community. Various experience-oriented, transformative reflection and communication methods were tested, including deepening reflection and dialogue techniques, visioning exercises, gaming exercises, and elements of embodiment practices and meditation. Table 1 (p. 177) provides an overview of the key methods used and their added value for reflection and communication spaces.

While the design principles given in box 1 describe fundamental values and attitudes that are important for creating transformative reflection and communication spaces as a whole, the selected methods (table 1) provide pathways for their concrete, purpose-specific implementation.

Competencies: mindset, skillset and toolset

Following the implementation of our experiments, based on the described principles and methods, we identified a spectrum of competencies that, so far, have not been part of the classic profile of facilitators and other actors in the field of climate and sustainability communication. While science communication is typically framed as the effective transmission of specific knowledge, transformative reflection and communication spaces focus more on receptive competencies. Examples include deep listening and the creation of trusting and open attitudes of appreciation and respect. We summarize these competencies as *mindset*, *skillset*, and *toolset*, which are described below.



BOX 1: Overview of design principles

Principles are complementary and mutually supportive. Regardless of the specific characteristics of individual sessions, the experimental spaces followed the listed principles. They oriented the design of the overall approach, the selection of particular methods, and the facilitator's style.

DESIGN PRINCIPLE 1:**Enable authentic encounters in safe enough spaces**

Experiencing a safe enough atmosphere is a basis for people to trust, open up and share meaningfully. Transformative reflection and communication spaces are meant to provide a non-judgmental and non-competitive atmosphere in which people can relate on eye-level as "experts in their own fields". This allows for authentic encounters, in which people can move beyond an exchange of fixed positions, to engage in deeper mutual learning and the exploration of new understandings. In such an atmosphere, conversations take place among imperfect human beings with their ambiguities and vulnerabilities, and their beliefs, fears, challenges, etc. can be shared.

DESIGN PRINCIPLE 2:**Enable and practice deep listening (and understanding)**

Deep listening comes from a genuine interest in understanding another person's perspective. It provides space to develop more integrated understandings of a situation and, hence, more holistic and viable pathways for joint action. Regional, local and personal contexts can be diverse, and others may be unaware of them. Deep listening allows people to develop an awareness of such context-specific perspectives and forms the basis for mutual learning. It may require patience, humility and openness to avoid jumping to interpretations too quickly, and instead asking for further clarification. Observing and assessing one's own feelings and reactions may support this process.

DESIGN PRINCIPLE 3:**Enable reflection, digestion, and integration (on various levels)**

Participants need sufficient cognitive and emotional space to make sense of the knowledge that is shared (e.g., as inputs from experts) and relate it to their own context. Having the opportunity to explore and understand one's own subjective concerns, feelings, values and deeper motivations supports building a personal connection with the topic. Following this principle, expertise is not only seen as a fixed resource that is provided one-directionally. Just as listeners require time to reflect and process, it is crucial that speakers receive feedback, and have opportunities to listen to and engage in conversations with participants, to gain insights into how their input makes sense and resonates.

DESIGN PRINCIPLE 4:**Facilitate development of relations and networks**

Quality relationships that are built on trust, shared values and objectives are key resources in transformation processes. Particular attention must be paid to allowing participants sufficient space and time to relate to each other, learn to know each other and explore similarities and differences in objectives, capacities and expertise. Building new social identities and groups can also support a shared belief in collective agency, which can lead to collective action. This can compensate for individual feelings of helplessness, or even enhance individual beliefs of effectiveness.

Mindset refers to the internal lens through which people see and navigate life; it thus influences perspectives and attitudes (Wamsler et al. 2020). It includes the ability to observe and understand one's own attitudes, thoughts, feelings, perceptions, and reaction patterns and consciously steer these toward sustaining a safe, authentic, and supportive space. It encompasses the ability to adapt and change one's inner self, respond to individuals, and respect the development of anything that may occur as the session progresses. Lastly, it includes personally embodying the principles and qualities contained in the specific method that is applied. For instance, if a method requires participants to listen deeply to another stakeholder, the facilitator him or herself needs to genuinely embody an attitude and practice of deep listening.

Skillset includes communication and social skills, notably the understanding of, and ability to design reflection and dialogue processes. It also includes the ability to facilitate a diverse group, even if there is disagreement among its members. In this context, practical experience is crucial, for example, to handle culturally sensitive issues or people who are emotionally overwhelmed and react with more sensitivity than they would do normally.

Toolset relates to personal knowledge of a repertoire of methods, tools, instruments, techniques, and technologies that support transformative reflection and communication in climate- and sustainability-related conference settings. Here, we focus on the ability to initiate transformative processes and promote transformative qualities in participants. It also refers to a practical un-

derstanding of knowing the right time to use a certain method, tool, or technique, and its limitations. Handling of moderation instruments and materials is another element.

Our observations suggest that all three categories are of central importance in the transformative communication processes we advocate, as they are interrelated. A specific method can be a powerful way to connect and invite openness towards other people; however, it is crucial to consider the context (environment, peer groups, etc.) in order to choose the optimal method. Finally, the facilitator must have sufficient knowledge and experience in using the relevant method(s) to facilitate multilateral group processes and create a transformative environment.

As it is unrealistic for one individual to master all of the clusters of mindset, skillset and toolset competencies in equal depth, we recommend working with a professionally diverse team that complements one another. For example, in our experiments, teams included practitioners and researchers with backgrounds in different disciplines and fields of practice. In addition to this mix of competencies, we gradually developed a system of rotating roles and responsibilities with respect to the facilitation process in each session.

To clarify the ideas outlined above and illustrate the context in which the principles and methods of transformative reflection and communication were tested, we now describe three experimental climate communication spaces. In the following, the abbreviation DP refers to the design principle, ranging from 1 to 4 (as described in box 1).

TABLE 1: Overview of the methods used. Each method has its own characteristics and provides different added value to the goal of facilitating more transformative science communication.

METHOD	PURPOSE	DESCRIPTION	ADDED VALUE for communication spaces on climate and sustainability
circle dialogue (Bohm 2013)	<ol style="list-style-type: none"> 1. Enhance openness and understanding of the diversity of perspectives amongst people. 2. Support actors in connecting to their deeper intentions and concerns and those of others and find common intentions. 	<p>Participants sit in a circle and each speaks in turn, while the others listen. There is no rule to say who speaks when, and participants can speak more than once. The idea is to consciously observe oneself and the group, and then say "what wants to be said". Contributions can build on what has been said before or form free associations. It is less about responding to other individual contributions, and instead contributing to a joint exploration.</p>	<p>Hearing multiple and seemingly- contradictory perspectives in a non-judgmental way. Participants share an experience of witnessing the emergence of an understanding that is not based on argumentation or competition among individuals. This experience can inspire them to reflect on their assumptions about communication and their opinions, and can enhance collaboration by dissolving mistrust and misunderstanding.</p>
socio-metric constellations (Howie 2010)	<ol style="list-style-type: none"> 1. Gives a sense of the diversity of potential clusters and blind spots in, and relations among participants' backgrounds. 2. Helps people to feel more connected to a new group or organizational field. 	<p>Physical space is used as a virtual map for various questions or concepts (geography, social sector, conceptual terms, etc.). Participants position themselves in the room with respect to this map, as a way to kick-off a conversation.</p>	<p>Feeling more connected to the group by gaining a sense of one's own and others' position(s). Constellations can reveal biases or latent conflicts, such as dominant or missing perspectives, and spark reflection on these issues.</p>
visioning exercise: 7th generation (Macy et al. 2014).	<ol style="list-style-type: none"> 1. Opens participants' imagination up to the possibility of a different and sustainable future society. 2. Allows participants to engage with their affective relation with the future (hopes, anxieties, etc.). 	<p>The session consists of a roleplay dialogue between people from our present generation and people from a fictional sustainable future, seven generations from now. People from the "present" talk, 1 to 1 about how they experience the current situation and what their struggles are. People from the "future" respond to what they have heard, speaking from the perspective, and with the wisdom of the future. This exchange is repeated various times, with different pairs. Specific questions can be addressed.</p>	<p>Connecting to an intrinsic sense of hope, exhaustion or despair about efforts for sustainability allows participants to recognize each other as humans in this process. It supports personal insights (e.g., potentials or blockages to change) and sparks deep, personal conversations. It allows participants to connect with often unconscious assumptions about the future.</p>
raja yoga meditation exercise (George 2006)	<ol style="list-style-type: none"> 1. Experience the unbalanced and unpleasant state of nature caused by climate change. 2. Cultivate a sense of compassion. 	<p>In this guided meditation, participants are asked to relax and concentrate. They are invited to consciously connect to, think of and visualize different aspects of nature in its present unhealthy state (e.g., floods or bush fires). They are guided to witness emergent thoughts, emotions and sensations from a place of compassion. The meditation can be followed by a discussion.</p>	<p>Connecting with, and around the shared experience of climate change is not only an abstract topic, but of emotional relevance to participants. It allows them to release emotions (to a certain extent) and sparks conversations around deeper personal motivations related to climate action.</p>
embodiment practice (Storch et al. 2014)	<p>Experience how the perception of verbal statements about anticipated climate change is influenced by postures and body language.</p>	<p>Pairs of participants are asked to repeat a statement about their own personal expectations of future climate change, while adopting different body postures relative to each other. They observe how this affects the emotional and physical experience of both what they express, and what they hear.</p>	<p>Realizing how the same content can be communicated very differently, thus provoking very different feelings and reactions in the other person, and seeing how this is not only verbally, but also somatically steered.</p>
appreciative inquiry (Cooperrider 2005)	<ol style="list-style-type: none"> 1. Identify personal resources for transformation. 2. Build relationships around a sense of mutual support. 	<p>Participants form groups of three. They are asked to remember a challenging situation that they overcame by drawing on their inner capacities. One person shares a story. The second listens deeply without interrupting, and the third shares his/her observations and reflections with the others.</p>	<p>Realizing that everyone has multiple resources, abilities, qualities and experience that can offer practical support when initiating change. Sharing and hearing stories of successful change strengthens motivation and inspires thinking about new solutions.</p>

Experimental reflection and communication spaces: the setting and implementation process

Conference of the Parties 24 and 25

UNFCCC conferences run over two weeks and attract some 15,000 to 20,000 representatives from the 193 member states and accredited local, national and international organizations. In the *COP* spaces that are run in parallel to official negotiations, a wide spectrum of experts present their knowledge in conventional formats, usually one *PowerPoint* presentation after another, or in standard-format panel discussions, with only a short time for questions or audience interaction (Schroeder et al. 2012).

To assess demand and explore possible formats for transformative communication, we offered several interactive workshops in pavilions and the civil society space during *COP24*. In these sessions, participants were welcomed into a safe environment that allowed for genuine encounters and dialogue about affective aspects and potential vulnerabilities. Based on this experience, which involved about 40 participants from diverse stakeholder groups (e.g., youth, NGOs, government), we then designed and implemented a larger-scale intervention, the *Co-creative reflection and dialogue space* (CCRDS) at *COP25*.

The CCRDS focused on exploring and discussing the communication culture at the *COPs*, and how it could be made more conducive to working together towards climate action. The program included a total of 20 workshops lasting 60 to 90 minutes that were oriented along three lines of inquiry. The questions invited participants to: 1. evaluate the current state of communication and collaboration at the *COPs*; 2. envision a future culture of communication and collaboration to support climate action; and 3. outline concrete steps to take towards achieving this future. Each session was designed around one of these questions. Passive observation was prevented through activating approaches. Trained facilitators guided interactive explorations of the themes through, for example, self-reflection, journaling and dialogical sequences (DP2, 3). Chairs were arranged in a circle and sessions started with a brief round of introductions, in which each participant shared how they personally related to the given topic (DP1). An additional 21 guest sessions were offered, where experts were able to discuss their research in a circular dialogue format. Traditional knowledge transfer was combined with interactive elements, such as reflective questions for personal sensemaking and peer discussions (DP1, 2, 3). Presentations were limited to 15 minutes and no slides were allowed.

Despite the extremely dense schedule, the CCRDS managed to attract more than 250 participants. The CCRDS at *COP25* was the subject of further analysis, notably regarding session outputs. Data were collected via surveys, participatory observation and expert interviews (for more information, e.g., on coding, data triangulation, methods for data collection and analysis, etc. see Wamsler et al. 2020). The results showed, amongst other things, that

- a changed communication culture is urgently needed to support climate policy and action,
- reflexive, dialogue-oriented methods, and environments are central to change this culture,
- specific personal skills can support this change, and
- the CCRDS proved to be a valuable approach for facilitating these aspects.

In fact, encounters within these formats were seen as particularly valuable, as the shared experience created a strong level of trust for further joint work (DP1, 4). Several participants noted that they valued the CCRDS and that they would like to see more such spaces in future *COPs* (Wamsler et al. 2020). Based on the analysis of the first experiments, we have also developed concrete policy recommendations regarding how to design enabling environments, use hosting practices that support reflection, interconnection, and action-orientation, and create networks and communities of practice for systemic change regarding the UNFCCC climate conferences (Mar et al. forthcoming).

The K3 Congress

The biannual *K3 Congress* series focuses on climate communication in the German-speaking community.¹ In 2019, the conference brought together some 500 participants from the fields of science, policymaking, the media, business and practice in Germany, Austria, Switzerland and beyond.

Together with Deutsches Klima-Konsortium (German Climate Consortium), we offered an early-morning session prior to the start of the day's program. The aim was to experiment with underlying or hidden non-verbal factors that influence climate communication and action, such as emotions (fear, insecurity, hopelessness, appreciation) and non-verbal language (postures, gestures, facial expressions, vocalics). Participants were invited to observe, reflect on and discuss their experience and insights from these experiments (DP3).

The session included three experience-oriented approaches including embodiment practices, meditation and yoga exercises. While much recent work has focused on the connection between embodiment and communication in other contexts, such as psychology, the topic is rarely addressed in climate communication (see table 1). In the last part of the session, we facilitated a reflection on the experiences and observations of participants (DP2).

Around 10% of conference participants joined in and actively engaged in all three practices. Many stated that it was the first time that emotions were purposely given consideration at a scientific conference addressing climate change (DP1). Some stated how feelings of fear and hopelessness often lead to apathy and blockages. The exercises themselves often brought up latent emotions, which could then be addressed and integrated into the group's activities. Several participants noted that understanding how these feelings connect to their mindfulness and physical

¹ The *K3 Congress* series is organized cooperatively by Climate Change Centre Austria (CCCA), Deutsches Klima-Konsortium, klimafakten.de, National Centre for Climate Services (NCCS) in Switzerland, and Akademie der Naturwissenschaften Schweiz (SCNAT).

presence contributed to releasing emotional blockages.

The *K3 Congress* proved to be a valuable platform for engaging with communication and reflection methods with experts in the field of climate change and/or science communication. Related insights supported the assumptions that there was high value in introducing other forms of communication, such as above-mentioned non-verbal language. Participants particularly welcomed the possibility to consciously connect to and include their emotions when talking about climate change. Finally, participants confirmed the importance of emotional engagement for taking action.

Symposium *How to...? From climate knowledge to climate action*

The principal goal of the symposium *How to...? From climate knowledge to climate action* was to bring together representatives from, in particular, museums and science communication organizations in order to explore how such places could contribute more meaningfully to facilitating action. The idea was to not only talk about the potential of these places but also give participants an opportunity to develop ideas together, while they were still at the conference. As most did not know each other, another goal was to foster connections within the network of science communication organizations.

Against this background, we facilitated two sessions with the aim of addressing both goals. Firstly, an introductory “sociometric constellations” session was offered. Here, participants could familiarize themselves with the diverse backgrounds and work contexts of the participants (DP4). We invited them to reflect on their personal motivations and any challenges that impacted their participation in the symposium (DP1). Secondly, we offered a workshop that combined several methods. In a “circle dialogue” we discussed the communication culture prevalent at conferences on sustainability (DP2). We then reported on the research results from the CCRDS held at *COP25*. This was followed by a silent personal introspection in which participants were asked to reconnect with their own experiences and capacities to engage in transformative communication approaches and processes around climate change (DP3). Finally, we hosted an “appreciative inquiry” that allowed participants to reflect on and exchange views regarding their own transformative communication experiences that had shifted something within and influenced personal behaviors (for details of the method, see table 1).

Finally, we asked participants to take part in a survey to capture their key insights and experiences from the session. The overall feedback was very positive. Participants appreciated that they had been invited into a conversation as a “whole human being” and considered this to be a key resource for meaningful exchange and relationship-building.

In all three experiments, positive feedback also came from those who participated as “experts” or “impulse givers” in the offered spaces. Many mentioned that they had rarely engaged in conference sessions where they felt that their input was received and processed with such depth. Finally, the mere fact that

space was provided for everyone to connect personally, beyond their affiliation and professional background, changed the nature of the subsequent conversations profoundly, leading to in-depth conversations about the personal and cultural changes needed to address climate change.

Recommendations

Drawing on our insights from our experiments with new communication spaces and formats, we invite scientists, practitioners, facilitators, politicians, and civil society groups working in the fields of climate change and sustainability to consider the following recommendations:

First, we strongly invite the United Nations Framework Convention on Climate Change (UNFCCC) to systematically encourage reflexive and dialogue-oriented formats as part of their annual conferences. The suggested principles and methods can contribute to establish pathways toward a trusting communication culture, which can support the processing of scientific information by engaging with people’s inner lives, including their beliefs, values, worldviews, emotions, and motivations. This is crucial for enabling personal and cultural transformation processes towards sustainability. On a foundational level, the suggested principles and methods are an expression and a manifestation of a changed understanding of climate communication: from focusing on exchange of knowledge to collectively shaping a culture of participation and mutual responsibility in addressing the climate crisis.

Second, we recommend a systematic exchange among scholars who are interested in experimenting with such formats. The shift in understanding in sustainability communication that is described in this article needs to be developed further, theoretically, empirically and practically. This requires combining knowledge from sustainability science with knowledge from psychology, behavioral and social sciences and the humanities to bring in, integrate and adapt practices for inner and outer transformation.

Third, we argue that designing and facilitating transformative communication processes for enabling climate action requires appropriate and systematic training. Mindset, skillset and toolset categories must be integrated into the work of groups of practitioners, facilitators and scientists to complement their existing competencies. Specific training on designing and facilitating communication spaces on climate change and sustainability should be further developed.

Fourth, we recommend more systematic development and evaluation of the kinds of spaces and formats that we have described in this forum article. Innovative and transdisciplinary research methods are needed to evaluate their relevance and their ability to nourish inner and relational qualities such as reflexivity, mindfulness and trust that relate to and influence our beliefs, values, worldviews, emotions, motivations and perceptions of climate change.



Lastly, we encourage scholars and other stakeholders engaged in science and sustainability communication to raise awareness of the need for spaces for reflection and dialogue in public places and conferences such as the COPs and support the development of related systems and structures. On the one hand, we need to enable any organization to host such spaces. On the other, we as researchers must collectively rise to the challenge of overcoming our own limiting structures by co-creating a communication culture that is conducive to collaboration and more effective at climate awareness raising and action.

We would like to thank two anonymous reviewers for their helpful comments. The IASS is funded by the German Federal Ministry for Education and Research (BMBF) and the State of Brandenburg Ministry for Science, Research and Culture (MWFK). The research was supported by two projects funded by the Swedish Research Council Formas: 1. *Mind4Change* (grant number 2019-00390; full title: *Agents of Change: Mind, Cognitive Bias and Decision-Making in a Context of Social and Climate Change*), and 2. *TransVision* (grant number 2019-01969; full title: *Transition Visions: Coupling Society, Well-being and Energy Systems for Transitioning to a Fossil-free Society*).

References

- Bohm, D. 2013. *On dialogue*. London: Routledge.
- Brink E., C. Wamsler. 2019. Citizen engagement in climate adaptation surveyed: The role of values, worldviews, gender and place. *Journal of Cleaner Production* 209: 1342–1353. <https://doi.org/10.1016/j.jclepro.2018.10.164>.
- Bruhn, T., J. Herberg, G. Molinengo, D. Oppold, D. Stasiak, P. Nanz. 2019. Grounded action design: Transdisciplinary co-creation for better transformative processes. Frameworks for transdisciplinary research #9. *GAIA* 28/4: 336–336. <https://doi.org/10.14512/gaia.28.4.3>.
- Cooperrider, D. L., D. Whitney. 2005. A positive revolution in change: Appreciative inquiry. In: *Appreciative inquiry: Foundations in positive organization development*. Edited by D. L. Cooperrider, P. Sorenson, T. Yeager, D. Whitney. Champaign, IL: Stipes. 9–33.
- Creutzig, F., F. Kapmeier. 2020. Engage, don't preach: Active learning triggers climate action. *Energy Research and Social Science* 70: 101779. <https://doi.org/10.1016/j.erss.2020.101779>.
- George, M. 2006. *Meditation als Weg. 10 Schritte zu Erkenntnis und innerem Wachstum*. München: Knaur.
- Grothmann, T. 2018. 3 Wege für eine handlungsmotivierende Klimakommunikation. Ergebnisse psychologischer Forschung. *Promet* 101: 15–19.
- Habermann, F., K. Schmidt. 2018. *Over the fence: Rediscover the joy of projects, develop new ideas better, and have more fun working together*. Berlin: Becota.
- Howie, P. 2010. Using sociodrama and sociometry to create group environments. *Group Psychologist* 20/2: 11–14. <https://doi.org/10.1037/e579732011-009>.
- IEA (International Energy Agency). 2021. *Net zero by 2050*. Paris: IEA. <https://www.iea.org/reports/net-zero-by-2050> (accessed September 2, 2021).
- IPCC (Intergovernmental Panel on Climate Change). 2018. *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Geneva: IPCC.
- Lawrence, M., P. Nanz, O. Renn. Forthcoming. Characteristics, potentials and challenges of transdisciplinary research. *One Earth*.
- Macy, J., M. Y. Brown. 2014. *Coming back to life: The guide to the work that reconnects*. Gabriola Island, BC: New Society.
- Mar, K. et al. Forthcoming. *Fostering reflection, dialogue and collaboration among actors at the UN Climate Change Conferences*. IASS Policy Brief. Potsdam: Institute for Advanced Sustainability Studies.
- Nanz, P., O. Renn, M. Lawrence. 2017. Der transdisziplinäre Ansatz des Institute for Advanced Sustainability Studies (IASS): Konzept und Umsetzung. *GAIA* 26/3: 293–296. <https://doi.org/10.14512/gaia.26.3.19>.
- Ockwell, D., L. Whitmarsh, S. O'Neill. 2009. Reorienting climate change communication for effective mitigation: Forcing people to be green or fostering grass-roots engagement? *Science Communication* 30/3: 305–327. <https://doi.org/10.1177/1075547008328969>.
- Overland, I., B. K. Sovacool. 2020. The misallocation of climate research funding. *Energy Research and Social Science* 62: 101349. <https://doi.org/10.1016/j.erss.2019.101349>.
- Pereira, L. et al. 2020. Transformative spaces in the making: key lessons from nine cases in the Global South. *Sustainability Science* 15: 161–178. <https://doi.org/10.1007/s11625-019-00749-x>.
- Pogatschnigg, I. 2021. *The art of hosting*. Munich: Vahlen.
- Schroeder, H., H. Lovell. 2012. The role of non-nation-state actors and side events in the international climate negotiations. *Climate Policy* 12: 23–37. <https://doi.org/10.1080/14693062.2011.579328>.
- Storch M., W. Tschacher. 2014. *Embodied communication. Kommunikation beginnt im Körper, nicht im Kopf*. Bern: Hogrefe.
- Trümper, S., M.-L. Beck. 2021. Transformative Klimakommunikation: Veränderungsprozesse in Wissenschaft und Gesellschaft anstoßen. *GAIA* 30/3: 162–167. <https://doi.org/10.14512/gaia.30.3.7>.
- UNEP (United Nations Environment Programme). 2020. *Emissions gap report 2020. Executive summary*. <https://www.unep.org/emissions-gap-report-2020> (accessed September 2, 2021).
- Wamsler, C. et al. 2020. Enabling new mindsets and transformative skills for negotiating and activating climate action: Lessons from UNFCCC Conferences of the Parties. *Environmental Science and Policy* 112: 227–235. <https://doi.org/10.1016/j.envsci.2020.06.005>.
- Wamsler, C., F. Restoy. 2020. Emotional intelligence and the sustainable development goals: Supporting peaceful, just and inclusive societies. In: *Encyclopedia of the UN sustainable development goals: Peace, justice and strong institution*. Edited by W. Leal Filho et al. Heidelberg: Springer. https://doi.org/10.1007/978-3-319-71066-2_123-1.
- Woiwode, C. et al. 2021. Inner transformation to sustainability as a deep leverage point: Fostering new avenues for change through dialogue and reflection. *Sustainability Science* 16 : 841–858. <https://doi.org/10.1007/s11625-020-00882-y>.



Carolin Fraude

Studies in education science, philosophy, social science, and psychology. Leader of the project *Co-Creative Reflection @ Dialogue Space* for the transdisciplinary research group *A Mindset for the Anthropocene*, IASS Potsdam, Germany. Research interests: design of processes engaging with people's beliefs, values and worldviews as leverage points for transformation towards a sustainable society.



Thomas Bruhn

Studies in physics. Leader of the transdisciplinary research group *A Mindset for the Anthropocene*, IASS Potsdam, Germany. Trained facilitator, member of the German chapter of the Club of Rome and the German Association of Scientists (VDW). Research interests: relevance of mental paradigms and co-creative processes in the context of sustainability. Earlier research focus: climate technologies and self-organization in nanomaterials.



Niko Schöpke

Studies in environmental sciences and economics. Assistant professor in environmental governance, University of Freiburg, Germany. 2018 to 2020, post-doctoral position, then *MISTRA* fellow, Chalmers University Gothenburg, Sweden. Research interests: approaches, methods and principles of transformative and transdisciplinary research, such as in diverse labs in the real world.