Robert Bosch Stiftung

How universities start conversations between citizens and scientists

Science, Man!

Talking to one another. Learning from each other.

Dialogue is the basis

PREFACE

Dear reader,

"Freedom is our system" was the 2019 slogan of the Alliance of Science Organizations in Germany, marking 70 years of constitutionally guaranteed scientific freedom. To this we would add "...and dialogue is our responsibility" in 2020!

The relationship between scientific freedom and social responsibility is a complex one. One basic assumption about this relationship is that freedom requires trust. Another is that science cannot exist exclusively in the proverbial ivory tower.

It is no longer enough for science to merely publish in major journals. To avoid being misinterpreted or even misused in current social debates, it needs to have a stronger presence and proximity to people and communicate its basic values. Universities in particular are now taking their responsibility as civil society actors and regional partners for the economy, politics, and the citizenry very seriously. In a world often perceived as overly complex, they are regionally anchored and renowned places of science with an important role to play in countering public mistrust and the increasing uncertainty surrounding scientific knowledge. A combination of personal encounters and open conversations is an effective means of creating trust and explaining scientific integrity and methods.

With this in mind, we organized the dialogue event "Science, Man!" in 2018 and 2019 with the aim of developing a blueprint for successful dialogue formats for citizens and scientists.

For many years, the science department of the Robert Bosch Stiftung has been working to establish sustainable links between science and society – bridges that should accommodate as many people as possible. Many projects have already emerged as part of this strategy: the University Communication Prize with the German Rectors' Conference, the SILBERSALZ Science & Media Festival, Falling Walls Engage, an international network for science engagement, and more recently, the Berlin School for Public Engagement in cooperation with the Berlin Natural History Museum and the Humboldt University. Information on these projects can be found on page 82.

The development and results of our largest dialogue project to date are presented in this publication. We developed "Science, Man!" to provide citizens and scientists with the opportunity to engage in discussions as equals. The brochure is meant as "recipe" for universities and other research institutes for encouraging their scientists to communicate with people who otherwise have little contact with science.

Who could be more credible than scientists in terms of imparting skills such as critical thinking, questioning information, evaluating complex situations, and setting up and testing hypotheses? What better way is there for scientists to understand people's concerns than to initiate an open conversation? What do randomly selected citizens know about science? What do they expect from scientists and how do they perceive scientific institutions?

Two figures from the detailed evaluation, which starts on page 45, reveal that there is strong interest in a real dialogue: 95 percent of scientists and 100 percent of citizens would attend such an event again.

We therefore believe that trust will grow and challenges will be better addressed if the scientific community and society engage in deeper discussions of this kind. In their next campaign, scientific organizations might also add: "...integrity, the common good and responsibility are our system."

We hope you find some inspiration in our words.

Eva Roth, Patrick Klügel, Katrin Rehak-Nitsche,
Niels Barth, Isabella Kessel

Please note, the term "science" in this publication includes all scholarly disciplines: the natural sciences as well as the humanities and social sciences.


Wie funktioniert das
Handwerkszeug
der Wissenschaft?
Niels
Barth

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A–I


Robert Bosch Stiftung
Herzlich willkommen!
Mensch Wissenschaft!
Miteinander reden.
Voneinander lernen.

Impressions & introduction

Trust in science

DOES SCIENCE COMMUNICATION NEED A CULTURAL CHANGE?

For virtually any discussion on topics ranging from particulate matter or vaccinations to climate change, opposing scientific views can almost always be found on the Internet. Yet fake news and half-truths tend to spread rapidly online, sometimes leaving factual information by the wayside. For researchers, the question is whether and to what extent they should be involved and take a stand in current social and political debates.[1] "It is not enough for science to neatly extricate itself by arguing that it only provides objective data and facts, leaving the political decisions to others," says Volker Meyer-Guckel, Deputy General Secretary of the German organization Stifterverband.[2] Furthermore, the German Minister of Education and Research Anja Karliczek recently put the topic on the political agenda in a policy paper on science communication. According to the paper, "It is necessary for scientists to engage in public discourse, communicate in a generally comprehensible way about their research work, and categorize correlations."[3]

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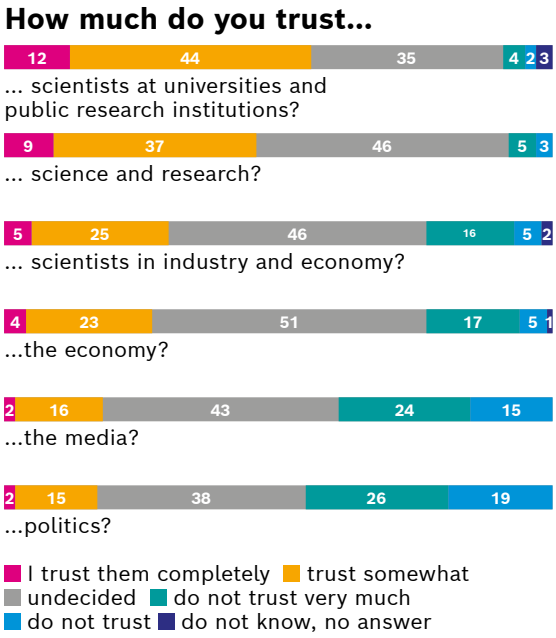
1 Weißkopf, Markus (2019): »Wissenschaftskommunikation muss sich auf die nächste Stufe begeben«, https://www.wissenschaft-im-dialog.de/blog/blogartikel/beitrag/wissenschaftskommunikation-muss-sich-auf-die-naechste-stufe-begeben/

2 Meyer-Guckel, Volker (2019): "Vom Verständnis zur Verständigung – Denkanstöße nach 20 Jahren PUSH" (From Insight to Understanding – Food for Thought after 20 Years of PUSH), /https://wissenschaftkommuniziert.wordpress.com/2019/05/27/vom-verstandnis-zur-verstandigung-denkanstose-nach-20-jahren-push/

3 BMBF (2019): "Grundsatzpapier des Bundesministeriums für Bildung und Forschung zur Wissenschaftskommunikation" (Policy Paper of the Federal Ministry of Education and Research on Science Communication), https://www.bmbf.de / upload_filestore / pub / Grundsatzpapier_zur_Wissenschaftskommunikation.pdf



Base: 1017 respondents | **Survey period:** September 2019 | **Source:** Science Barometer – Wissenschaft im Dialog/Kantar Emnid | Figures in percent – possible rounding differences

Surveys reveal a lack of understanding – and skepticism

Many citizens are clearly interested in science. This has been indicated by representative figures from Wissenschaft im Dialog (WiD)'s Science Barometer since 2014. On the one hand, there is a great deal of interest in scientific topics and a high level of trust within the population. In 2019, almost half of those surveyed (46 percent) said they trusted in science and research, while a similar number were undecided. According to the results, only eight percent have little or no trust.

On the other hand, the 2017 survey revealed that almost 30 percent did not know what it means to research something scientifically. A clear majority also doubt whether scientists are impartial – and whether they are truly interested in the common good.[4] In addition, 40 percent of those surveyed recently found that science and research are causing living conditions to change too quickly.
A joint statement issued by European science academies in January 2019 maintains that skepticism about science in several European countries has been on the rise since 2016.[5]

Many data indicate a general lack of knowledge of what researchers are doing. People doubt the impartiality and motives behind science and are concerned about the ramifica-

4 Wissenschaft im Dialog (2017): "Detaillierte Ergebnisse des Wissenschaftsbarometers 2017 nach Subgruppen" (Detailed Results of the 2017 Science Barometer by Subgroup), https://www.wissenschaft-im-dialog.de / fileadmin / user_upload / projects / Science barometer / documents_17 / Wissenschaftsbarometer2017_Tabellenband.pdf

5 All European Academies (2019): Trust in Science and Changing Landscapes of Communication, https://www.allea.org/wp-content/uploads/2019/01/ALLEA_Trust_in_ Science_and_Changing_Landscapes_of_Communication-1.pdf

tions of technological progress. These are the key challenges when initiating an exchange between science and society. Changes in discussion culture, especially on online platforms, where an excess of unverified information and closed filter bubbles exist, only exacerbate the situation.

Researchers took a stand early on

Back in May 1999, the leading German scientific organizations committed to promoting the dialogue between science and society in the PUSH memorandum ("Public Understanding of Science and Humanities"), which speaks of enthusiasm, discussion, but also justification of science. A lack of scientific understanding or dashed expectations might however lead some people to turn to pseudoscience and to become increasingly unwilling to support research that does not clarify its social relevance.[6]

Science in Germany should therefore also be made more accessible to a wider audience, in accordance with the Anglo-Saxon model. The introduction and expansion of numerous communication and marketing departments at the universities and scientific institutions began with PUSH. At the same time, the leading German scientific organizations founded the Wissenschaft im Dialog (WiD) initiative in 2000, which promotes the exchange of information on research through various formats. Today, the Academies of Sciences are also tasked with sharing information, in part with an explicit mandate to advise political bodies, as the German National Academy of Natural Sciences Leopoldina has been doing since 2007.

Key demands have not been met to date

However, the undisputed progress of public relations work and science communication must also be critically examined. According to experts, it is still difficult to claim that a scientific incentive system for communication services exists. Especially among young researchers, a commitment to scientific dialogue does not enhance their reputation, as Carsten Könneker, Managing Director of the Klaus Tschira Foundation, has observed. "Culture has not yet shifted."[7] Moreover, there is a lack of comprehensive further education programs for professionalizing communicators – with the exception of the National Institute for Science Communication (NaWik).[8] According to many observers, one of the key demands of the PUSH memorandum has not been met to date: A truly "bi-directional dialogue" between science and society.[9] Research shows that large target groups are still not being reached – even those that consider science important but have little contact with it.[10]

In addition, many experts are criticizing another development 20 years after the memorandum. The marketing side of the communication of science has also grown significantly, as scientists compete to boost their reputation and third-party funding has increased. However, if greater focus were to be placed on marketing and advertising, it would damage the credibility of science in the medium term.[11]

Science journalism is under pressure

Science journalists are one of the traditional interfaces in communication between researchers and society. The main reason for this is not because they offer appealing, comprehensible content across different media, but above all because they provide a critical point of view on scientific results. But in the context of the crisis in the traditional publishing media system, this discipline is increasingly being stripped of its economic foundations. As Peter Strohschneider, the former president of Deutsche Forschungsgemeinschaft (DFG), the biggest German research funding organization, noted three years ago, "Scientific journalism is under great pressure." This is reflected by the decreasing frequency and quality of reporting.[12] The Robert Bosch Stiftung has also observed that scientific journalism can no longer live up to the claim of having a broad impact. For example, the usage behavior of younger generations has shifted

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6 Oetker et al. (1999): "Dialog Wissenschaft und Gesellschaft" (Dialogue between Science and Society). https://www.wissenschaft-im-dialog.de / fileadmin / user_upload / About_us / via_documents / Push_Memorandum_1999.pdf

7 Könneker, Carsten (2019): "Gastkommentar: Es geht ums Ganze!" (Guest comment: It's about the whole thing!), https://www.helmholtz.de / science_and_society / it-all-around /

8 Rehländer, Jens (2019): "Das unterschätzte Gespräch mit Politik und Gesellschaft" (The Undervalued Conversation with Politics and Society), https://zeitung.faz.net / faz / politics / 2019-05-16 / 06543b9c1dac1b64830fca5c9266169d / ?GEPC=s3

9 Winkels, Rebecca (2020): "20 Jahre PUSH" (20 years of PUSH), https://www.wissenschaftskommunikation.de / 20 years of push-we-meant-it-seriously-when-we-spoke-about-the-dialogueue-34445 /

10 Schrögel et al (2018): "Nicht erreichte Zielgruppen in der Wissenschaftskommunikation: Literatur-Review zu Exklusionsfaktoren und Analyse von Fallbeispielen" (Unreached Target Groups in Science Communication: Literature Review on Exclusion Factors and Analysis of Case Studies), https://wmk.itz.kit.edu/downloads/Zwischenbericht_Wissenschaft_fuer_alle.pdf

11 Meyer-Guckel, Volker (2019)

12 Strohschneider, Peter (2017): https://wissenschaftkommuniziert.wordpress.com/2017/02/07/wir-haben-dramatische-vermittlungsprobleme/

strongly toward social media, with the result that serious scientific journalism no longer reaches larger target groups at all.[13]

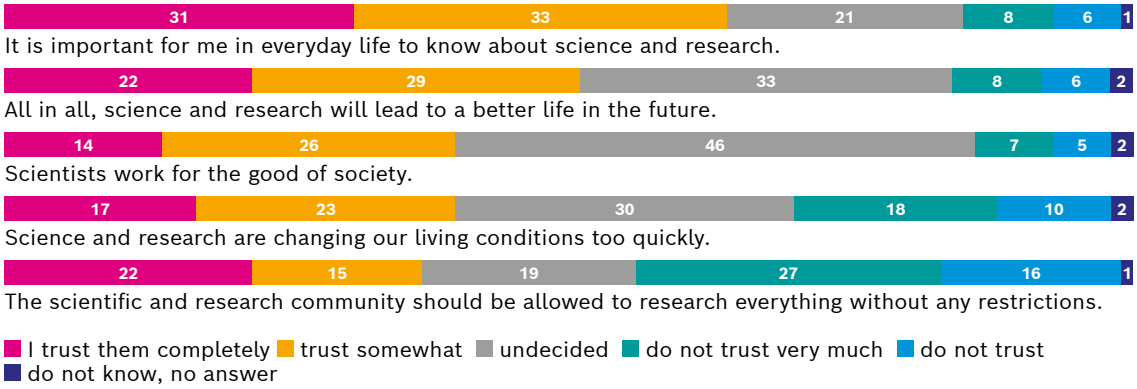
But there are also conflicting developments. Independent publishing initiatives such as the Science Media Center and RiffReporter – a group of freelance journalists – are gaining ground. Both companies are attempting to build a close connection with their community. Young new media stakeholders are being promoted, for example, at Bayerische Landeszentrale für neue Medien (BLM), the regulatory authority for new media in Bavaria. Individual knowledge and science intermediaries such as the German chemist Mai Thi Nguyen-Kim are reaching wide audiences via social media. Such actors, some of whom work for public broadcasters, are able to reach new, younger target groups and get them involved in the creation of the content by asking them questions.

Universities are also in on it

A growing number of universities are also reinterpreting the old notion of the university as a place for social debate. School labs have been set up and staff positions have been created to provide companies with expertise or technology. Moreover, some universities are reinforcing contact with actors from outside academia – which is also referred to as the "third mission" alongside research and teaching. In a study authored for the Körber Foundation, university expert Peter Maassen notes that it is often new study programs that address social challenges or students who are encouraged to engage in social activities. Overall, however, the commitment requires further development and support. And, according to Maassen, universities are not effectively communicating their achievements to society.[14]

A new approach to reinforcing contact between science and society has taken hold in the Anglosphere in recent years. The idea behind "public engagement" or "science engagement" is for both sides – scientists and non-scientists – to learn from each other.[15] In recent years, new forms of dialogue have emerged in many places, often supported by actors such as foundations. Some examples are science slams, pub evenings with researchers, chats with scientists, citizen science projects, or "joint puzzling" – laypeople and experts searching together for solutions to problems. It remains to be seen whether trust in scientific knowledge can actually be sustained through these new forms of dialogue between science and society.

To what extent do you agree with the following statements?



Base: 1008 respondents | **Survey period:** August 2018 | **Source:** Science Barometer – Wissenschaft im Dialog/Kantar Emnid | Figures in percent – possible rounding differences

13 *Medienpädagogischer Forschungsverbund Südwest (2018): JIM Study 2018. Youth, information, media, https://www.mpfs.de/fileadmin/files/Studien/JIM/2018/Studie/JIM2018_Gesamt.pdf*

14 *Maassen, Peter (2019): "Der Ort der Hochschule in der Gesellschaft" (The University's Place in Society), https://www.koerber-stiftung.de/fileadmin/user_upload/koerber-stiftung/redaktion/gulch/pdf/2019/GUC-Studie_Kurzfassung_Der_Ort_der_Hochschule_in_der_Gesellschaft.pdf*

15 *See https://www.publicengagement.ac.uk/*

Both sides should learn from each other

OBJECTIVES AND MOTIVATION BEHIND "SCIENCE, MAN!"

Trust in science stems from three sources: expertise (special skills and knowledge), integrity (compliance with rules), and good intentions (aimed at the benefit of the common good).
See pages 12 and 13

"Science engagement" or "public engagement" is a new approach to communication between science and society. It is based mainly on a dialogue in which both sides can learn from each other.
See page 11

In this context, "scientific literacy" is understood as the population's basic education on scientific principles, findings, and processes – specifically, the way in which this knowledge is obtained.
See page 12

How can the interests of science and society be reconciled and negotiated in dialogue in a way that fosters trust and enables joint action?

The Robert Bosch Stiftung has developed the discussion format "Science, Man!" in response to this key question. The underlying belief is that science can only work in society if there is mutual trust. Dialogue partners who take the interests, concerns, fears, and competencies of the other seriously can discuss sustainable changes in values, culture, and behavior for the benefit of all of society in the long term. A science community that listens to people is more likely to be considered as having integrity and good intentions. The aim of such a dialogue must be to make the problems, questions, competencies, and interests of people the focus of the discussion between science and society. Science communication is traditionally understood merely as imparting knowledge and expertise; this needs to be replaced by mutual learning as well as exchange in the research process. This will allow understanding, mutual trust and appreciation to grow.

The term "scientific commitment" refers to some good examples of this approach that already exist. It applies to any stage in life during which people may have an interest in scientific knowledge, and as such involves people of all ages and backgrounds and establishes regular communication with scientists as a natural occurrence. This creates a wide range of opportunities for non-scientists to share their questions, concerns, doubts, and also their own experiences from everyday life, with scientists. For their part, scientists are prepared for different kinds of encounters – and experience them as added value. An important aspect here is the use of comprehensible language.

A focus on the integrity and good intentions of scientists

The communication of science in recent decades has been heavily focused on the guiding principles of "expertise" and the "freedom to seek the truth." As a result, the expertise of scientists has been overemphasized. The aim of the Robert Bosch Stiftung was therefore to develop a new format for meeting, discussing, and cooperating that specifically focuses on the building blocks of trust – namely integrity and good intentions – which were neglected in the past.

As a discussion platform, "Science, Man!" is specifically intended for citizens who have demonstrated a neutral to positive attitude toward science until now, but have little understanding of how scientific knowledge is developed. For this target group, it is particularly important that scientists present their work in way that is easy to understand, remain open to critical discussions with non-scientists, and seek to build trust on a personal level. Wherever connections are too complex for citizens to grasp, the aim is to increase their willingness to tolerate uncertainties rather than subscribing to what appear to be easy solutions. In order to protect vulnerable target groups from disinformation campaigns on scientific matters, it is important that they understand the value of scientific evidence and how it is developed, and why facts cannot be replaced by opinions and claims. At the same time, a better understanding of how science works – the "scientific literacy" of society – also reinforces the ability of citizens to participate in the democratic process.

Objectives of the event

The key objective of the event is not to produce material results such as joint statements or to agree on a position. Instead, the methodology of the overall process (see page 11) aims to provide further training for both scientists and citizens:

- Scientists will learn how laypeople perceive (their) research, what sparks interest, what the priorities are from the citizens' perspective, about barriers to communication, and the reasons behind problems of understanding and distorted views. Ideally, they will realize that the layperson's perspective can enrich their research.
- Scientists are reminded of their social responsibility and realize through experience that it is in their interest that as many social groups as possible have a basic understanding of their work.
- Citizens learn how science works, what methods there are, how to tell whether scientific findings carry weight or not, and where they can obtain reliable and comprehensible information on scientific topics.
- Citizens are developing a fundamentally more positive attitude toward science.
- The participants are interested in maintaining contact and an ongoing exchange of ideas among themselves.
- Universities therefore view this format as an excellent way to breathe life into their own "third mission."

Three basic problems with the dialogue between science and society:

1. Traditional interfaces mainly follow non-cooperative and non-dialogue approaches and methods.

2. The guiding principles of science were previously focused too heavily on expert opinion. The two building blocks of trust in science – integrity and good intentions – are rarely addressed in science communication.

3. Much of society is uninvolved in communication activities. Certain groups have not yet taken part in the dialogue at all.

In addition to the first and second missions of the universities – research and teaching – the "third mission" is to engage with society. *See page 11*

How do I find the needle in the haystack?

INFORMAL USER GUIDE

You can of course read this brochure from cover to cover in the traditional way, but perhaps you are too short on time. In any case, it would be a shame if you only had enough time to go through the extremely brief summary on page 15. This is why we also offer an alternative way to approach the content that goes "against the grain": Choose a statement that piques your interest and start reading where indicated. This is the quickest way for you to determine whether this brochure will be useful to you.

Universities already communicate professionally in many ways, and it is quite sufficient. **p. 8**

Read about why a new dialogue is still needed – page 8.

University events are always attended by the "usual suspects." **p. 72**

Read about how to attract a diverse audience to the dialogue with scientists – page 72.

Scientists and citizens cannot find a common language in which to hold a constructive conversation with each other. **p. 19**

Read about how the didactic methodology of "Science, Man!" can promote a discussion among equals – page 19.

The communication team of my university would like to hold a dialogue event with citizens, but... **p. 62**

Follow the detailed instructions, which include many tips and examples in the toolbox, starting on page 62.

Too long, didn't read

SUMMARY AT A GLANCE

The Robert Bosch Stiftung has created the dialogue event "Science, Man!" with the aim of providing a scalable example of successful dialogue between citizens and scientists that universities and research institutions can adopt.

The self-set goals (see page 12) were largely achieved after the implementation of a pilot event in Essen in 2018 and the adaptation of a didactic methodology in a second event in Stuttgart in 2019 (see below). At the same time, the development and results of the overall project also revealed obstacles, limitations, and unresolved issues in establishing an open dialogue between science and society in specific formats. It took considerable effort (see page 72) to recruit a diverse group of participants, aided by a remuneration incentive for citizens who participated. However, the project reached very few of those who truly had hardly any knowledge of science. The citizens who participated appeared to be more interested in having increased contact and exchanging more information than did the scientists.

In several workshops during the event, the key challenges in communicating science were identified: to consistently address target groups, use simple language, and ensure broad access via a wide range of modern channels. At the same time, a lack of intermediaries and bridge builders such as science journalists was also noted. Citizens and scientists were in great favor of universities assuming greater responsibility in the future, which they could do by holding similar dialogue events, for example. As shown in the detailed evaluation (see page 45), the event format is a suitable way for scientists to initiate sustainable community building with the people in the region.

"Science, Man!" breaks down barriers and raises awareness of the social missions of the scientific community

- The event framework increases the willingness of all participants to engage in a dialogue: "Science, Man!" sends the signal that "we can do even more" to bring scientists and citizens closer together.
- The scientists found their participation personally enriching and see the event as a first step in eliminating any misgivings about science and research.
- They receive positive reinforcement in their commitment to science communication, gain awareness of the concerns of citizens, and draw methodological conclusions, for example, on how to remove barriers and obstacles in a direct exchange.
- Scientists sometimes gain inspiration from the lay perspective for their research.

Citizens appreciate a direct exchange of information and the chance to get involved by asking questions and contributing their own expertise

- Citizens are motivated to participate mainly because they are fundamentally curious about this unusual interaction. They see "Science, Man!" as an opportunity to learn new things about fascinating subjects and come into direct contact with researchers.
- They believe that discussions on specific topics and clearly formulated event objectives are required for a successful dialogue.
- In particular, citizens appreciate the personal discussions among equals and the opportunity to participate in smaller group discussions.

Didactic structure over two days links the common themes of specific research topics to overarching questions for science

- The two-day event format of "Science, Man!" and the overall time frame were considered appropriate and sufficient.
- The plenary session was thoughtfully moderated in a way that motivated participants and quickly established clear connections to the individual elements of the program.
- The moderation took an effective approach of starting with a brief introduction of specific research topics and then steering the discussion toward more abstract, overarching topics.

Keynote presentations and moderation provide the foundation and structure for discussions on relevant research topics

- Moderators with didactic awareness enable balanced and appreciative discussions following specialist keynote presentations.
- Citizens have a chance to formulate their own demands on science and any misgivings they have about research, while also contributing their own expertise.
- Scientists can directly respond to citizens' questions, opinions and misgivings, and impart scientific values and methods.

Citizens need guidance for discussions of overarching guiding questions

- The selected overarching or meta-questions about the responsibility, role, values, methods, and organization of science are considered significant and interesting by all participants.
- Citizens have little prior knowledge of the basic structures and functioning of the scientific system. There is a clear need to reinforce knowledge about science ("scientific literacy").
- Discussions on the guiding questions are perceived as relevant and forward-thinking, but also challenging. Citizens need guidance, instruction and moderation in this respect.

Participating scientists see a high transfer potential of "Science, Man!"

- The transfer potential of "Science, Man!" as a "blueprint" for universities and other scientific institutions is highly valued by the participating scientists.
- They can imagine adapting it to their university and implementing it there as a way of contributing to the "third mission."
- The concept should be adapted to the resources and means of individual universities and fine-tuned in terms of topics such as research strategy.

Event documentation

Here's how it works

METHODOLOGICAL CONSIDERATIONS FOR THE OVERALL PROCESS

There are a number of questions to consider before establishing a dialogue as equals between citizens and scientists: Who should be invited? How can suitable citizens and scientists be identified? How large should the participant group be? How many citizens, how many scientists? Concerning the event itself: What would be a suitable location? How should the event be organized in order to encourage discussions among equals? What could be discussed? What should be done if people lose interest in the dialogue? It is precisely from these people that you can learn the most. It does not take long to figure out that standard panel discussions do not work in this case. We have therefore experimented with other discussion formats and designed the overall process in such a way as to reduce social anxiety and inhibitions. Based on experiences from the pilot event in Essen, including the feedback of all participants and the assessment made by external evaluators, the following guidelines were established for the overall approach in Stuttgart:

Hold the event over two days

The best results were achieved by holding the event over two days, ideally on a Friday afternoon and Saturday morning, in order to also accommodate as many employed people as possible. The Friday afternoon was mainly reserved for a warm-up with the participants in triads, which are mixed groups of three. After in-depth dialogue phases, the first day ends with a dinner together, which is an excellent opportunity to deepen newly made contacts in an informal atmosphere. In this way, the representatives of both groups will quickly resume the conversation on the second day.

Use professional moderators

It is important to use professional moderators in order to maintain a clear structure, introduce the various parts of the program and ensure good transitions, enable heated discussions to be summarized, organized, and visualized, and – together with the organization team – create a relaxed atmosphere.

Work with different group sizes

To keep things interesting, the program alternates between segments with the whole group, workshop formats with 10 to 15 participants, and triads. Most of the work should be done in small, mixed groups of scientists and non-scientists. The total group size should not exceed 80 to 100 people. The smaller the groups, the better the participants can get to know each other. The triads in particular are ideal for more in-depth discussions.

Triads
Participants get to know each other in mixed groups of three through interviews about their interests, place of residence, hobbies, holiday plans, etc.: see page 68

Thematic workshops
Input and discussion of a scientific topic that is currently being discussed in society: see page 69

Meta-workshops
Discussion of key issues that touch on overarching themes in science: see page 71

The inside story
Scientists use six guiding questions to pass on knowledge about the scientific system in addition to answering questions about their day-to-day work: see page 70

Coffee break
The coffee break is an integral part of a successful dialogue event that gives participants a chance to get to know each other better: see pages 32 and 33

Discussions on current research topics on the first day

In terms of content, we structured "Science, Man!" in such a way that the first day focused on the scientists' current research in six "thematic workshops" and the second day dealt with overarching questions about science and science communication in "meta-workshops". Citizens were able to register in advance for the themed workshops, on the first day of the event, which included topics such as plastics or mobility research, lobbying in democracy, nutrition, livestock farming, or the media. Looking back on the experience, the scientists were very impressed by the participants' enthusiasm during the discussion as well as the challenging comments and many technical questions the citizens posed. The thematic workshops gave the researchers the opportunity to try presenting science to citizens in a true-to-life setting. Some citizens turned out to be experts themselves and were able to enhance the understanding of a given topic from a user perspective (for example, a winemaker with knowledge about climate-friendly food).

Questions on the research system and science communication on the second day

Based on the research topics of the first day, the second day was dedicated to the exchange of information on meta-level questions, such as: How does science work? How is it financed? Why is science important? In an open communication format, scientists were invited to provide insights into their day to day work. After that, it was the scientists' turn to ask questions: What are the citizens concerned with? What do they know about science? What do citizens expect from science? And how do they perceive scientific institutions?

Coffee breaks and good food deepen the dialogue

In addition to the working formats that you will find starting on page 29, we found that it was important not to overload the program and to allow sufficient time for participants to eat together and take extended coffee breaks. Many key insights for the participants developed from these side discussions. As an incentive to continue the dialogue after the event, the participants were given vouchers for local cafes, which they appreciated very much.

Rating of the event planning as a two-day format

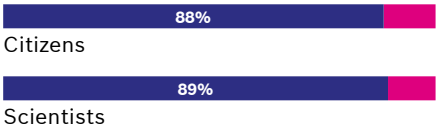


Figure: shown in blue, the values 1 and 2 on a scale of 1 = “very good” to 6 = “not good at all”

INTERVIEW WITH WOLFRAM RESSEL, RECTOR OF THE UNIVERSITY OF STUTTGART

Why were you here today?

The Robert Bosch Stiftung invited us to participate in this dialogue session with the aim of bringing citizens and science together for discussions. It's an excellent idea, one that we also use at the university with other models. I agreed to it right away.

What were your expectations of the event?

Scientists need to be able to explain the complexity of the world to citizens, and problems that citizens may have must be reapplied to science. This interplay, this dialogue, is an essential means of increasing the acceptance of science. We also need to ask ourselves how we can introduce the findings from our scientific work into society. This is what they tried to do with this event and I believe it was very successful.

What were your observations?

I actually saw citizens and scientists speaking and listening to each other and asking questions. They were having a discussion as equals, which was the whole point. I thought that was very nice.

Is there a big gap between non-scientists and scientists at the moment?

I can't say whether the gap is big, but it's there, yes. It comes from both sides. As scientists, we need to learn to find the right language to explain our results. Why is something the way it is? What makes it difficult is that often there is not only one true opinion, but many. How can we reconcile them, how do we weigh them up? This is the discourse we need to be having. On the other hand, there are citizens who evidently keep their distance from science because there are things they don't understand. The solution is for both sides to meet each other in the middle. The place where the two intersect is usually where we find the innovations we need.

Did any surprising questions come up that you took away with you?

What I saw was that a number of questions did come up which stumped the scientists leading the talks and all they could honestly say was "I don't have the answer to that right now." Sometimes they are simple questions. As scientists, we tend to be able to answer very complex questions, but then we sometimes overlook very simple matters.

What else do you think should be made part of such an event?

The Robert Bosch Stiftung initiated the dialogue between science and citizens with the events in Essen and Stuttgart. Of course, this may only be the start. It is up to us at the universities to further develop and amplify this social dialogue. How can we address the major social challenges we face, such as climate change, mobility, and more? How can we shape this conversation to prevent ourselves from drifting away from each other, but instead join forces and benefit from it collectively?

(This interview was condensed and slightly revised.)

The challenges of establishing exchange

HOW DID THE COMMUNICATION PLAY OUT BETWEEN SCIENTISTS AND CITIZENS IN STUTTGART

They keep to themselves, their findings stay untangible. This is the impression that non-scientists have of scientists. This came up repeatedly. What happens when researchers and citizens in Stuttgart get meet together? An overview of two days of dialogue.

The citizens of Stuttgart brought not only positive images of science to the StadtPalais on this Friday afternoon. “If you want to change something, you also need to start right in front of you,” says Ulrich Wölleke, a retiree. The former design engineer at Daimler from Stuttgart has arrived early. He checked his coat and collected a sticker with his name from the front desk in the lobby. Now he is waiting and a bit anxious. As he puts it: “Possibly both sides will need to learn from each other.” For instance, when it comes to questions such as how to solve the problem of plastic in the environment. Monika Arnold has also taken a seat in one of the chairs in the large hall, surrounded by wooden panels. “Science is important, but I’m not sure whether discussions with citizens always go that smoothly,”
she says.

The exchange between 50 citizens from the region and 27 scientists from a wide range of disciplines, including plastics technology, the media science, zoology, political science, and agricultural economics it taking place in Stuttgart's StadtPalais over two days in November. “The most important thing for us is that people listen to each other,” says

Isabella Kessel, Senior Project Manager at the Robert Bosch Stiftung.

Friday, 4:30 p.m., plenary session.

After the welcome, the participants stand or sit in the hall in small groups, each consisting of one or two scientists and two or three citizens. Some talk about their hobbies and how difficult it is for young scientists to land a permanent job. Others talk about language. “I often find it very difficult to read scientific texts,”a young man says.

“Sometimes I have the feeling that they are deliberately trying to sound as complicated as possible.”
Citizen

A young woman nearby asks a scientist his opinion on whether skepticism about science is justified. “It depends on the field of expertise,” he answers. This just shows that there is no clear answer to many of the questions people came up with on this day.

Friday, 5:00 p.m., workshop rooms.

Discussions are held in workshops and provocative questions on six current issues are formulated: How does our demand for milk, meat, and eggs impact modern farm animals? Are vegetarians saving the climate? Is lobbying in a democracy a curse or a blessing? What can we do given that plastics are indispensable? The media – who cares? What's the problem with cycling in Stuttgart? The scientists spend a few minutes brainstorming and then move on to the group discussion. It becomes clear that in many of the workshops, the participants are engaged at a high level. They are very interested and often in agreement with each other. For example, that the consumption of animal products is neither beneficial to the climate nor to animal welfare. Or that it would make sense to reduce car traffic in the city. However, it also becomes clear that many people do not understand why political and social debates fail to take scientific facts into consideration. This is at least how many of the participants perceive it. Could scientific labels ensure whether a given product was produced without animal cruelty?

Or which information in the media can be trusted? Do scientists need to take greater responsibility for their research and its effects for issues such as plastics? Or is it up to politicians and consumers to do something about it? In any case, citizens are clearly interested in the latest research and in specific research results.
The final survey of the event indicates that nearly 80 percent of them would have liked to spend even more time participating in the discussions.

Consideration given to individual topics and opportunities for discussion

Current research and research results

Figures in percent

■ = just right, ■ = too little, ■ = too much
Question: How do you feel about the weight given to the topics and the opportunities for discussion and debate?

Friday, 6:45 p.m., plenary session.

The moderators have collected the thoughts, facts, and questions that emerged in the thematic workshops on colorful sticky notes and displayed them on partition walls. One of them reads, "A researcher in one field cannot solve the world's problems." The one next to it says, "Society thinks science can fix everything." Many more sticky notes with thoughts about plastics are lined up under these two statements. One of them says that a plastic bag used twice has a better ecological footprint than a cotton bag used three hundred times. The next partition wall concerns the issue of whether Germany needs lobby regulation similar to the US. One pink sticky note here says: "Greater transparency is needed." Next to that: "More regulation is likely to lead to restrictions."

Friday, 7:15 p.m., lobby.

Eighty-year-old Ursula Gläser and winegrower Roland Färber sit at a small table in the spacious lobby of the StadtPalais. Over dinner, they talk about food, climate change, and agriculture. Both had attended the workshop on this topic. "What surprised me is that cheese has such a bad carbon footprint, since I only eat cheese and not meat," remarks Gläser. As for Färber, he wonders about the role of society within the debate: "Is it really true that agriculture is the driver of this mass production, or is it rather the consumer who determines what and how much is produced?"

Saturday, 9:00 a.m., plenary session.

"The question for me is how I as a scientist can share my knowledge of the problems around modern farm animals – and whether this would change buying behavior," says agricultural biologist Korinna Huber. In this morning's plenary session, she is discussing her impressions from the previous day. She says that a lot of questions were raised in her workshop. But she still doesn't know how to get through to the general public with her knowledge as a scientist. Bioeconomist Elisabeth Angenendt has the same question. In any case, she found the exchange with the citizens very enriching. "I work mostly with farmers. I was surprised at how quickly an open and effective discussion developed during the workshop."

While plastics technology scientist Christian Bonten found that the discussion "did not really contribute anything new," political scientist Patrick Bernhagen had an overall positive impression of the thematic workshop. "We scientists often stay inside the bubble of our own discipline," he says. But the participants asked him questions that he did not expect. Yet, the discussion was very nuanced, which surprised him. Business psychologist Thomas Bäumer also gained a completely new perspective on his field of research in the exchange. "The question was actually about how sustainable cycling is. The focus of the discussion then shifted to the fact that a city can become more beautiful when there is less car traffic – I found that remarkable." Media scientist Boris Kühnle took on a new mission for science from his workshop: Which media can be trusted and how can we recognize quality? "One option would be to develop a kind of quality label," he says. The survey conducted after the event revealed that, on the whole, nearly all scientists consider the questions, perspectives, and experiences which the citizens brought up to be very important.

Saturday, 9:15 a.m., lobby.

Participants from the different thematic workshops now sit together in circles and share their impressions of the talks. "We have not found an answer as to who is responsible for the plastic problem," says one scientist. "But we understood that it may not always be necessary to avoid plastic." Two citizens observed that, generally speaking, many people in society are unaware of the impact of their own consumption, such as when they buy cheap clothing or cheap meat. Others nod in agreement. Then a man from the thematic workshop on cycling notes that "the questions would have to be how to activate politicians to do more and encourage drivers to switch over."

Saturday, 9:45 a.m., plenary session.

The entire group then has an open discussion about the strengths and weaknesses of the event format. An elderly gentleman says, "As a citizen, the discussion comes across to me as highly emotional,"he says, referring to the social debate as a whole. "I would appreciate if there were more facts." He adds that the event demonstrates that there is no one truth. "Scientists should communicate this better." One scientist says he is much more aware now of his responsibility of communicating his research findings with the public. "But I also think that citizens need to reach out to us too, to a certain extent as well." Other scientists also say that it is becoming increasingly important to explain complex research results and to converse with citizens at all. "This format is exactly what we need in the future," says bioeconomist Elisabeth Angenendt.

Saturday, 10:00 a.m., lobby.

Over a cup of coffee, Ekaterini Malliou from Stuttgart asks the bioeconomist what her day-to-day work is like and who actually verifies the results of a study. Angenendt explains that scientific texts are thoroughly reviewed by anonymous experts for specialist journals.

Saturday, 10:30 a.m., workshop rooms.

What tools do scientists have at their disposal? Is science independent? And what does science communication achieve? Newly formed groups discuss these questions. In the lobby of the StadtPalais, Wolfram Ressel, Rector of the University of Stuttgart, explains what “basic universtiy funding” is all about and the difference between basic research and applied research. The participants in the group have noted a few questions on pink sticky notes and pinned them on a wall. One of them says, “Advancing research through funding from companies?” “Universities need to base their work on findings,” argues one scientist. “And these days they are actually forced to raise more money,” says another.

It is noisy next door in the plenary where a larger group is talking about science communication. “It seems that citizens are interested in having discussions and getting information, but they do not know how to go about it,” notes Patrick Klügel, project manager at the Robert Bosch Stiftung. What if there was a kind of science Wikipedia, a platform where also questions could also be posed? How can I separate fact from fiction? Some of the scientists claim that universities and science journalists already offer many ways in which to share information. However, it seems that citizens are largely unaware of them. The discussion revolves around the fact that researchers often have very little time for science communication in their daily work, and that science communication efforts do not advance their careers.

All in all, around two-thirds of the scientists and non-scientists are satisfied with the discussions on meta-topics and the guiding questions of the event. The researchers in particular find the meta-workshops an effective format for conveying the basic principles of science.

Saturday, 11:45 a.m., plenary session.

During the final round in the plenary, an older gentleman sums up what was common in all the discusion rounds by saying that the citizens are the “good guys” because of their interest in knowledge and higher education. "But what the universities have to offer doesn't really appeal to us citizens. Both sides need to move towards each other" he says. In the feedback session, several participants are very positive about the exchange between scientists and non-scientists as equals during the event. “I was delighted to learn that people are so interested in science, but also that they already know so much,” says one scientist. One of the citizens wants to know where the dialogue can go from here. “What we have achieved now can only be the beginning,” she says.

One option would be to develop a kind of quality lable.
Boris Kühnle, media scientist

This format is exactly what we need in the future.
Elisabeth Angenendt, bioeconomist

A long line has formed in front of the buffet table in the lobby of the StadtPalais in Stuttgart. Now that the program is over, most of the participants are still eager to carry on the conversation. They keep talking while eating at the tables. A young woman has written her email address on a sticky note. “I think it would be great if we established a regular meeting after this so that we can continue the discussions,” she says. The dialogue event ends on a high note and hardly anyone wants to leave.
Some citizens from the thematic workshop on cycling have gone over to business psychologist Thomas Bäumer, who is already holding his bicycle helmet. They have a few more questions for him before thanking him for the great talks and discussions.

We scientists often stay inside our scientific bubble.
Patrick Bernhagen, political scientist

What the universities have to offer does not trickle through to citizens. Both sides need to meet in the middle.
Citizens

INTERVIEW WITH THOMAS BÄUMER, BUSINESS PSYCHOLOGIST AND PROFESSOR AT THE STUTTGART UNIVERSITY OF APPLIED SCIENCES

What did you expect from the dialogue with the other participants?

I found the guiding questions intriguing: What is the role of science in our society? Are we seen as neutral experts? Is it worth it to carry out very costly scientific work? I really do not know whether citizens realize how massive this field is overall. And do citizens feel as if they benefit from it? And maybe some guidelines from the citizens' perspective: What is science allowed to do and what is not allowed? How relevant is science from the citizens' point of view?

Do you feel there is a big gap between citizens and the science community?

I don't know – I live in a bubble myself. My colleagues are all scientists and my environment is academic. They obviously consider science to be highly important.

Do you think positively about this format?

I thought it was great that this kind of event exists. Yes, I think it's important for people from different professions and from different social groups to meet in order to get some idea of how we perceive each other.

Was the dialogue a success?

Yes. Because of the way the event was organized, we were able to start the conversation quickly. At first, I was unable to tell the scientists apart from the citizens.

What is your impression of the thematic workshop on cycling?

In the group discussion, we very quickly reached the point where I currently am in my work. The exchange actually gave me perspectives for new approaches. I often have tunnel vision and the group gave me good ideas for doing some things differently.

What learnings did you get out of it for yourself and your research?

I have an idea for setting up a kind of citizens' panel for my own research. The next step might even be a co-creation approach in which citizens examine my work and tell me whether they understand it. That will provide a new set of questions. So in the end society will actually have posed the research questions.

In your opinion, how successful is the communication set up between science and society in general?

The formats that we as universities and colleges currently offer to build bridges do not work well all that. Apparently, what we do does not get through to a lot of people at all. For example, we realized during one discussion that people do have questions, but they don't know who to go to. I think we don't communicate enough to society as a whole – as scientists, we are too slow in this regard. There are clearly limitations to this. I can't always be making videos on current issues and posting them somewhere because it takes time, and that is time taken away from research.

What surprised you during the event?

I was pleasantly surprised that people really understand the relevance of science and have a very positive overall image of science, even to the extent that they expressed the need for more funding from the state. But in return, we also have to give more back.

(This interview was condensed and slightly revised.)

What I want to know is what stops people from using bicycles?

Thomas Bäumer,
business psychologist

From cycling policy to media literacy

REPORTS FROM THE THEMATIC WORKSHOPS

Cycling currently accounts for eleven percent of the total traffic volume in Stuttgart. According to the city, the target is 25 percent. “What I want to know is what stops people from using bicycles,”says business psychologist Thomas Bäumer. His question was the subject of a workshop on Friday afternoon. A poster in the workshop room reads, “Stuttgart can do everything, so why not cycling?” Around 15 people are sitting in a circle in front of it.

“A lot of people don’t live close to where they work,” says one young participant. She does not want to cover more than 50 meters of altitude on her commute. This is a prerequisite for her. But because there are so many hills in Stuttgart, it’s more than that for most people. What’s more, many major employers tend to be located outside the city. “Many companies don’t have a place to shower,” says another participant. And then there is the infrastructure for cycling in Stuttgart, which most people agree needs to be improved. The government is not doing enough, she adds. After a few exchanges in the discussion, it becomes clear that most of the people sitting in this workshop are proponents of cycling. However, the discussion addresses not only the actual barriers to cycling, but also the overall issues that affect mobility and traffic in the city. For instance, Bäumer wants to know whether people would like to see less car traffic in Stuttgart: “My feeling is that a lot of people are resistant to this in general,” says Bäumer, looking around the group. A few participants nod. “Be-

cause there are no alternatives," one young man replies. But it is clear that fewer cars would mean more free space in the city, and therefore a better quality of life. "On the other hand, there are a lot of jobs in the car industry, so it would be wrong to demonize it," says one woman. The discussion moves on to the advantages and disadvantages of car rentals and ridesharing as alternatives to cars used by individuals. Many ideas emerge: How about a carpool lane for cars carrying several people? How can we prevent people from standing on the side of the road for ages waiting for a carpool? And why are cars associated with freedom in the first place? Most of the questions remain open at the end. "I'm skeptical," says one of the participants. "I think it has a lot to do with attitudes and people just want to be alone in their car." People dislike change, says Bäumer, and supposedly many scientific findings to support this.

Questions about the quality of the media – and how science can contribute

A much more controversial discussion is going on a few meters away. Boris Kühnle, a media scientist at the Hochschule der Medien in Stuttgart, has written a provocative question on the poster on the wall: "Media – does anyone still need it?" To begin, a brief survey reveals that many participants associate newspapers with quality, while they are rather critical of Facebook. But several people in the group repeatedly ask whether traditional media, and public broadcasting in particular, are unbiased.

"The media used to be more diverse, but lately, perhaps since 2009, they tend to side with the government," says one young man. "The media no longer have a clear message," says another participant. Kühnle, on the other hand, says that the editorial work of public broadcasters in Germany is very unbiased, especially compared to other countries, even though there are political representatives in the broadcasting council. The question of how independent the media are, says Kühnle, is quite a "fascinating research question." One participant wonders how to keep people from believing that "everything they see on YouTube is true." "We agree that we need to learn how to deal with media and that we need better media education," says another. But how can you filter the flood of information? How can you develop awareness? And how can science help in developing media literacy and assessing truthfulness? With a kind of quality label indicating that the information provided has been verified? In regards to this issue, some of the participants feel that certain things have gone wrong in recent years. The participants hope that science will not only provide ideas for more media literacy, but also an answer to the question of whether the quality of reporting has changed.

A very enriching experience

A SCIENTIST'S PERSPECTIVE ON THE "THEMATIC WORKSHOP" FORMAT

by Dr. Elisabeth Angenendt

I led the thematic workshop "The greenhouse gas balance in agriculture – does being a vegetarian protect the climate?" at the "Science, Man!" event. The subject has been the focus of my scientific work for many years. In the meantime, the general public has also gained an awareness of it, as I discovered on my way to the venue of the event. It was Friday and thousands of people were demonstrating at a climate change protest in the city center of Stuttgart.

Around 15 people between the ages of 25 and 80 had took interest in my workshop. After a brief keynote speech, we immediately entered into a very interesting and complex discussion. I was amazed at how well informed the participants were and how many of them are trying to integrate climate-friendly behavior into their daily lives. I was also surprised that excessive meat consumption has been an issue for some of the participants for quite some time. While ethical aspects and environmental problems are closely associated with this topic today, the focus in the 1980s was more on the famine in Africa.

It was also very exciting that we had a winemaker in our group. He described the impact of climate change on his daily work. For example, his wine harvest is now almost a month earlier than it was ten years ago. All in all, the thematic workshop and the entire event were a very enriching experience for me, and also an opportunity for many friendly and personal encounters.

How to break the ice

ABOUT THE IMPORTANCE OF COFFEE BREAKS AND THE DISCUSSION BETWEEN THREE PEOPLE

How do you get people to exchange views and engage in open discussions with one another, even if they have reservations about each other?

"People from Stuttgart East, please go to one side of the room and people from Stuttgart West, please go to the other side. If you drove here, go over to the window. If you biked here, go opposite them, and if you took public transport, go to the other side." Moderator Stefan Gross split up the participants in the room with these instructions after the initial greeting. The people are regrouped over and over and discover things they have in common with each other. This type of sociometric grouping is a method used as an icebreaker at the beginning of an event to encourage communication between people who don't know each other. If one finds out that someone lives only two streets away from oneself or that another person also came by bicycle despite the rain, there is a communality, and this reduces barriers to connect with each other. The method is working in the StadtPalais in Stuttgart. The participants look around, comment, and make jokes. The atmosphere is warming up.

It also warms them up for the next part of the program, where one scientist and two citizens form groups of three to ask each other personal questions: "Where do you like to go on vacation?" or "What is your favorite activity, or even your passion?" A card game is also used to break the ice. The first card contains these introductory questions. The second card contains the key questions of the event: "Who funds science?" or "How unbiased is science?" These questions pave the way for initial discussions on the actual topics before the meta-workshops.

Discussions continue during the coffee breaks throughout the day. Even organizational difficulties are mentioned: "I had to print out the participant consent form, sign it, and scan it again. It was such a hassle I almost didn't feel like coming anymore," says one citizen over coffee. People talk about their reasons for participating in the event. The curiosity among the participants is obvious: Who comes to such an event and why? What do the others do? What can you learn from the event?

Only after the conversations get started it becomes clear who works in science and who does not. Scientists and citizens are not identified as such. There are no (academic) titles on the name tags. As a result, there is no sense of hierarchy at all.

People laugh, listen, and check in with someone who doesn't say much. This is actually what surprises some people: They were not expecting to be given so much freedom to speak and to get involved in the conversations. Later, the smaller groups talked about the effectiveness of the dialogue: Did everyone get a chance to speak? Did scientists talk more often or say more than others? Was everyone allowed to finish what they were saying? Especially in this round it is helpful when one after the other is asked to say something. It gives the quieter people in the room a chance to speak up as well. One scientist says, "I have become aware of how self-referential science is. We don't talk to citizens enough."

Later at dinner, the self-service buffet makes it easier for people to switch discussion groups more often, when getting up to fetch another serving. The day appears to be ending on a successful note, with many participants lingering at the tables for a long time. On the second day, no icebreakers are needed to get the conversations going. In particular, the triads formed at the start of the event come together again repeatedly.

Tips and tricks

- Allow sufficient break times. The exchanges that occur during these phases are much more informal and help to reduce reservations and social anxiety.

- In small groups, it helps to have each participant speak in turn. This gives people who are more reserved a chance to get involved in the discussion. Scientists are generally used to speaking in front of large groups.

Importance of opportunities for social interaction

The shared meals provide an ideal opportunity for people to get to know each other even better in a relaxed and informal atmosphere.

The introductory rounds (triads) at the beginning brought scientists and citizens closer together and prepared them for an open discussion.

Figure: shown in blue, the values 1 and 2 on a scale of 1 = “very good” to 6 = “not good at all”
Question: How successful were the individual segments of the event in enabling an open and appreciative discussion among the participants?

As equals

A CITIZEN'S PERSPECTIVE ON THE FORMAT OF "TRIADS"

by Michael Emmelheinz

We were aware of the distinction between citizens and scientists throughout the whole event. However, this distinction quickly faded during the triads, giving way to an emphasis on individual preferences and shared interests, such as the pleasure of a fine wine, or a vacation spot where one person had already been and the other still wanted to go. An outsider would probably not have been able to tell the scientists apart from the citizens. This way, any social anxiety that people might have felt at the beginning quickly disappeared.

We took the opportunity to ask the scientist, who was the expert for the thematic workshop, about his field of specialization. These were the first steps toward a deeper conversation, which I personally very much appreciated. I have rather strong feelings about the media in particular, based on my subjective perception. It was fascinating to hear a fact-based perspective on the subject. For me, neither the facts nor the feelings were right or wrong, but instead they complemented each other. Two insights were already apparent at that point that were later reinforced:

1. Scientists are of course also citizens with their everyday concerns, desires, and challenges. They are looking for answers just as much as we "ordinary" citizens do.

2. The scientists also don't have one single answer to all the questions. However, they are able to base their opinion on more facts and research, as far as their field of expertise is concerned, which can enrich the debate in a positive way, since we citizens generally do not have access to these facts.

Scientists also discuss topics outside their area of expertise with just as much common sense and emotion. Both are needed to find answers to urgent questions.

A plea for more bridges

REPORT FROM THE META-WORKSHOP "WHERE CAN YOU FIND INFORMATION AND WHAT DOES SCIENCE COMMUNICATION ACHIEVE?"

How can I separate fact from fiction? What is fake news and what isn't?
Citizens

People voted by stomping their feet: With 22 participants, the workshop "Where to find information about science" was clearly the best attended of all the meta-workshops. Most of the participants had already expressed strong opinions in a lively discussion the day before about whether we still need the media at all. The question was exaggarated to stimulate discussion – and was immediately criticized by citizens due to its suggestive nature (see pages 30 and 34). Now a scientist picks up the discussion. He says that, by nature, scientists tend to formulate findings in an objective and sophisticated way. However, these findings are often incorrectly represented, especially in the mass media. "And this is why I ask myself, how can I separate fact from fiction? What is fake news and what isn't?" adds a citizen. They later agree that, despite all the ideas for a label and a quality check, there will probably be no absolute certainty when it comes to truthfulness.

Scientific information does not reach the public

But then the discussion turns to fundamental issues. Most of the citizens' questions show that they do not receive any scientific information at all. "Where can I get information? How do I know what you're working on? Who can I ask questions from a professional context?" asks an employee of an automobile company who would like business and universities to cooperate more closely. One scientist declares vehemently: "We are not an ivory tower! You can always call the university, but nobody ever does!" But when asked whether there is a general telephone number on the university's website for citizens to call with their questions, he has no answer.

Even for those scientists who are strongly committed, their willingness to communicate seems to have its limits. When one citizen cautiously asks how young people can obtain information if they don't feel at ease calling the university or don't read the newspaper, the answer is: "How much hand-holding do people need?" After all, scientists would not be paid to communicate their results to citizens. In order to stop the gap between citizens and scientists from growing wider, the two sides manage to find a common image that enables them to tackle the problem: More bridges are needed to connect with each other.

The group then goes about finding bridges. Bettina Neumann from the communication department at the University of Stuttgart suspects that the public simply needs to be made more aware of the many sources of information that already exist. She names a few, such as the events of the International Center for Cultural and Technological Studies (IZKT) at the University of Stuttgart and articles published by RiffReporter, a network of independent science journalists. But as it turns out, such sources are not part of the usual way these citizens obtain information. With an overabundance of information, science appears to have a hard time getting through.

Tips and tricks

Sources of information mentioned in the workshop (all in German):

- RiffReporter.de
- www.uni-stuttgart.de/universitaet/fueralle
- PerspectiveDaily.de
- Leschs Kosmos (YouTube)
- MaiLab (Youtube)

An opportunity for systematic dialogue?

The impression that scientists and citizens want to come together is slowly solidifying, but each side expects the other to take the bigger step. Both sides refuse to budge, resulting in an unsatisfactory stalemate. Events like “Science, Man!” naturally provide many opportunities for personal conversations, but as one scientist puts it “How can we enter into a systematic dialogue in which we also integrate questions from citizens into the research?” Considering the scope of the task, an event even bigger than “Science, Man!” would be needed, one that would also involve journalists and politicians. The idea is met with much approval. It appears that the bridge over the gap between science and society simply needs to be better built.

How important is the subject of “science communication and sources of information on science” for the dialogue?

(very) important

Figure: shown in blue, the values 1 and 2 on a scale of 1 = “very important” to 6 = “not important at all”

There is no absolute truth

REPORT FROM THE META-WORKSHOP “HOW DOES SCIENCE WORK?”

A small group is gathering for a workshop in the corridor on the upper floor of the StadtPalais. Only a few participants appear to be interested in finding out how the tools of science work. The group finds this surprising: “Before asking anything else, you need to know how science works and why something is considered to be the current state of research,” comments one scientist. Although it is now considered a core task of communicating science to help people understand the processes that generate scientific findings and the provisional nature of the results, it seems that it is not an established practice. This is also confirmed by the results of the participants’ survey conducted at the end of “Science, Man!”: Compared to the other topics offered, the “methods of science” were rated as the least interesting (see page 53).

But this doesn't keep the group from engaging in a discussion. They don't seem to find the subject too dry. To get the ball rolling, each participant asks a question that has been on their mind. Three main areas are identified: What methods are used in the different disciplines? How do researchers actually come up with topics? and: When is a scientific result considered to be "true?"

Variety of methods in the toolbox

It quickly becomes apparent that there are scientists from a wide range of disciplines in the group who can share what they know about a broad selection of methods. Not only the citizens learn new things about measuring, synthesizing, calculating, and analyzing texts. The insights into the working methods of the other disciplines are also an enrichment for the food chemist, the literary scientists, the civil engineer, and the geodesist. An important learning from the discussion is that the science toolbox is equipped in many ways.

"Who actually sets the research agenda?" asks one citizen. It's a surprising but legitimate question for the scientists. In spite of their academic freedom, scientists do not work exclusively on topics of their choice. They explain that, depending on the discipline, the working environment, and the need for third-party funding, there are indeed guidelines. Whether directly through contracts from industry or indirectly through financial incentives used by politicians to increase the focus on trending topics. The group did not discuss the extent to which this gets in the way of scientific freedom. A parallel workshop is dedicated to this question. The difference between basic research and applied research is briefly discussed, but there is not enough time to go into detail.

When or how can knowledge be declared as 'true'? And who declares it as such?
Citizen

Who actually sets the research agenda?
Citizen

What is truth in science?

The big advantage of the discussion format and the familiar conversational situation is that it encourages non-scientists to formulate questions in a refreshingly unconventional way. The scientists react very openly, and no one makes a fuss about vague terms or hides behind their professional authority. The starting point of the most intense discussion of the workshop is the following question asked by a citizen: "When or how can knowledge be declared 'true'? And who declares it as such?" The group comes to the conclusion that truth in science is not absolute, but rather a consensus on the current state of research, which is formed according to certain rules and only applies until proof of the contrary is shown. The provisional nature of research results is then quickly noted on the pin board as an important characteristic of the scientific search for knowledge.

It also becomes clear that, in addition to common features such as the methodical/systematic approach, the various disciplines apply different quality criteria. Whereas in the natural sciences, for example, experiments must be reproducible, objectivity in the humanities can only be used as a measure of scientific excellence to a limited extent. In the latter, for example, it is about the comprehensibility of the argumentation and the identification of the sources.

At the end, the discussion touches briefly on the question of whether the validity of research findings can also be determined by whether they are perceived by society or have any impact on it at all. The literary scientist explains that in the humanities, the appearance of methodologies and scientific debates are an important measure.

After the discussion, a citizen and a scientist present key points from the discussion in tandems in the plenary session. They each speak for nearly the same amount of time – a sign that the format is working.

“Everything we have is based on science”

REPORT FROM THE META-WORKSHOP “HOW DOES SCIENCE CHANGE OUR LIVES AND WHO BENEFITS FROM IT?”

For Korinna Huber, the answer is perfectly clear. “Everything we have is based on science,” says the agricultural biologist and professor at the University of Hohenheim. It is just after 10:30 a.m. on the second day of the event. “Science is constantly changing our lives,” she says. A few workshop participants in the room nod in agreement. “But there is also a lot of research that is hardly relevant to everyday life,” says one young man in objection. The two scientists in the room address the discrepancy between basic research and applied research. At the beginning of a research project, it is often unclear whether it will ultimately generate useful findings for everyday life, says one of the scientists. Researchers are mostly driven by curiosity. “The person who invented plastic could not have foreseen that one day it would be omnipresent.” The question for many is who takes responsibility for the consequences of certain inventions.

Unwanted consequences – who takes responsibility?

Are scientists responsible for this? Can science solve these kinds of problems? Is there a need for a policy that sets out regulations or at least engages in a more in-depth discussion with the scientific community? and: Can citizens also be involved in certain ways, given that public funds are often used for research? The group largely agrees that there must be a better, more critical discussion about the unwanted consequences of scientific developments, such as those nuclear technology or genetic engineering. And science should therefore remain overall financially independent of the private sector. But Korinna Huber believes that the responsibility is not only in the hands of the scientific community. The agricultural biologist also points out “We are very much aware of the need for animal welfare – but people clearly don’t want to hear it. They are not willing to pay more for good products or change their behavior.”

A request for guidance

REPORT FROM THE META-WORKSHOP “WHAT ROLE DOES SCIENCE PLAY FOR DEMOCRACY AND THE COMMON GOOD?”

In the basement of the StadtPalais the participants in this workshop agree that science plays an important role for democracy and the common good. There are 15 people sitting in the room – five scientists and ten citizens. The question is: How can scientific knowledge and facts be better communicated in order to initiate political decisions on the one hand and provide citizens with sound information on the other?

Who can provide guidance?

“Yes, it is a known fact that there are synthetic fuels,” says one young man who works with an automotive supplier in the region. “Now the media are saying that the politics is against them and in favor of electric cars. As citizens, we are baffled.” He finds that the media contribute to black and white thinking in society. Social media in particular tends to emphasize individual experiences rather than encouraging nuanced discussions, adds another participant.

But whose responsibility is it to share information and initiate an informed debate? How do you get to the “truth”when the media and politicians don’t provide any guidance? Is it up to scientists to provide information directly through channels such as social media? “Sometimes I think people need to assume their own responsibility and inform themselves properly,” says one young man. Overall, people rarely take the time to delve into a topic in depth, agrees another participant.

Opportunities exist but they often fail to get through

Also in other meta-workshops such as the one on science communication, participants demand more scientific facts, more guidance and more exchange with science in general. At the same time, it seems unclear how to successfully engage in such an exchange and where good sources of information can be found.

“The scientists may provide opportunities but many of them don’t seem to get through,” says Patrick Klügel, Project Manager at the Robert Bosch Stiftung. It is becoming apparent that explaining and communicating will be more important in the future, he adds.

“The supply doesn’t meet the demand. Both sides – scientists and citizens – repeatedly emphasize that the sources of information are not accessible.”
Patrick Klügel, Project Manager
at the Robert Bosch Stiftung

“Bridges need to be built better,” one man says in the plenary session after the workshops. “All sides need to take a step toward each other.”

INTERVIEW WITH BETTINA MAST, RETIREE

Can you please introduce yourself?

My name is Bettina Mast. I am participating as a citizen. When I was asked to take part, I felt very honored and I accepted immediately.

How did you like the event?

I simply find it interesting to get to know such people. We really had the chance to talk to a scientist. Not once during the entire time did I think: Oh they're boring, or they have nothing to say. They were all very motivated and interesting.

Do you feel that there is a big gap between scientists and citizens?

I have to say that there actually aren't any scientists in my circle of acquaintances. They are all employed in the private sector, in public service, or elsewhere. So far, I have had few opportunities to talk to scientists. But they are also just normal people. And they're not just sitting in their lab, they're also interested in getting it across. So for me, the gap was there because I didn't know them. Now I know them and find them very normal.

Have you learned or experienced anything new?

There is no one truth. Even scientists from the same field have different approaches and are therefore not always in agreement. I also realized that a study is only significant at the time when it is carried out. The state of knowledge is actually only temporary at any given moment.

Would you attend another event like this?

Yes, it would be nice to be able to do this again. But it doesn't have to be this big and at a place like this. It was a lot of work to organize it. But it wouldn't be bad to meet with a group of people regularly to discuss ideas outside of my own circle of acquaintances who are also very interested and enthusiastic. That would be great.

The second day was about scientific independence and how science is funded. Did you find that interesting?

Funding seems to be a big issue. I think the government should continue to make money available to enable independent research, including research whose benefits are not immediately apparent.

Is science relevant to you personally – and to society as a whole?

Definitely. I think this is why research should also be done within a specific context: We need things like new antibiotics, or another alternative to batteries, so that research on electrofuels can continue, and that's where funded research from the private sector is very important.

(This interview was condensed and slightly revised.)

Evaluation

“Science, Man!” as a blueprint?

EVALUATION OF THE EVENT

The com.X Institute for Communication Analysis and Evaluation was commissioned to provide an independent evaluation of the project history and the event concept for the event in Essen in 2018. The task was to assess the design approach, evaluate the achievement of the objectives (see page 12), and develop recommendations for adapting the format after the pilot event in Essen. The preparation of the 2019 event in Stuttgart leaned largely on the recommendations resulting from this initial assessment. com.X also followed and analyzed the second dialogue event.

For this publication, com.X has produced the following summary, which includes learnings from both events.

Many participants in Stuttgart had a strong interest in science

Participants in the dialogue session are systematically selected according to socio-demographic criteria, such as gender, age, and formal educational background. This approach results in an overall heterogeneous field of participants. However, there is a distortion in terms of educational attainment, especially in Stuttgart: 68 percent of the participants have a high school diploma, while 42 percent have a university degree.

For the citizens participating in the dialogue session in Essen, interest in the event itself or in science and research in general plays a lesser role in their participation as for citizens in Stuttgart. This is probably because the participants at the first event received a significantly higher compensation. In Essen, this allows people from less educated milieus to be reached, but it also means that some of them are passive or openly disinterested.

On the other hand, at the event in Stuttgart, the non-scientists are willing to talk and engage in discussions at a consistently high level. However, this shows that those citizens who have an inherent affinity for research topics or a proximity to science are most likely to engage in discussions with the scientific community – for instance, in their professional or personal environment – and this is probably symptomatic of many science communication schemes. It is clear from the feedback of scientists and citizens that the participants in Stuttgart belong mainly to a well-informed, middle-class segment of the public with a fundamental interest in science whose input to the discussions often cannot be distinguished from those of the scientists.[1]

1 Not surprisingly, the share of participants who have visited a science museum (77 percent) or a scientific event (38 percent) in the last twelve months is significantly higher than in the general population of Germany. The representative comparative nationwide figures for this according to the 2018 Science Barometer are 36 percent (science museum) and 24 percent (science event); source: https://www.wissenschaft-im-dialog.de / fileadmin / user_upload / projects / Science Barometer / documents_18 / Downloads_general / Tabular_Wissenschaftbarometer 2018_final.pdf.

Background

The evaluation of the two “Science, Man!” events in Essen and Stuttgart focuses on their function as pilot programs and supports their development as a learning format. Several methods have been used to analyze the achievement of the objectives:

- Desk research
- Participatory observation and participation in internal meetings
- Online survey of citizens/scientists/moderators (only in Stuttgart; full survey)
- Qualitative interviews of citizens/scientists/moderators (Essen: N = 18; Stuttgart: N = 17)

There are also differences between the two events with regard to the background of the researchers. In Essen, natural scientists and engineering scientists are somewhat under-represented. In Stuttgart, the group of participating scientists is more balanced. Here, scientists are referred by the partner universities. In addition, the event in Stuttgart will initially focus on research topics from various disciplines. However, several researchers at both events have an exceptional communication background due to either their research field or prior experience with similar discussion formats. According to the survey, around half of the scientists in Stuttgart recently participated in science communication events and around a quarter even organized these themselves.

The event as a mission and a means to achieving a common understanding

As a key motivation for participating, non-scientists describe their fundamental curiosity about participating in an unusual discussion. They view "Science, Man!" as an opportunity not only to learn something new about fascinating topics, but above all to meet the people who are researching them. Even if the participants do not have any specific expectations due to lack of prior experience, the majority of them are able to grasp the premise of the event: According to most of the citizens in the survey, a stronger dialogue between the scientific community and society is needed in order to counter growing resentment and doubts about the credibility of scientific results.

"I don't have a scientific education. It's interesting to meet people who do." Citizen

From the scientists' perspective, on the other hand, the overall objective of the event in Stuttgart is to explicitly eliminate the barriers and obstacles between society and science. While the title of the event "Science, Man!" in Essen strikes

There were hardly any populist views – the spectrum of opinions was very homogeneous.
Citizen

Important topics and objectives for the dialogue

Figure: shown in blue, the values 1 and 2 on a scale of 1 = “very important” to 6 = “not important at all”
Question: How important are the following topics or aspects to you in principle when science and citizens exchange views and hold discussions?

many as polarizing and evokes skepticism, in Stuttgart it is seen more as an appeal for understanding. This differing view could also have to do with the fact that scientists and citizens in Essen sometimes hold separate discussions, whereas the groups in Stuttgart are mixed throughout.

“The event thrives on these contrasts, but they must not become more pronounced!” Scientist

Several scientists hope that the event will result in a transfer of knowledge to society in support of the “third mission” of the universities. At the same time, they also wish to enhance their personal skills in didactics and science communication.

The relevance of the event topics for a dialogue between the scientific community and society can be seen in the results of the interviews in Stuttgart. However, interviews with citizens also reveal that factors such as personal exchanges and the opportunity to contribute are considered at least as important to a successful dialogue.

This was a fascinating and useful addition to my main field of work. Political scientists are already very interested in dialogue.
Scientist

We need to get out of our ivory tower, show what we are doing, and present both positive and negative findings.
Scientist

The icebreaker game was a good way to achieve a relaxed atmosphere. It quickly lightened the mood.
Citizen

Very well informed people with a fascinating background.
Scientist

Good framework conditions for dialogue and discussion

In both Essen and Stuttgart, the events were organized professionally and sensibly at attractive venues, which ensured a pleasant atmosphere for people to meet on equal terms. Only the poor acoustics, due to suboptimal conditions for working in groups in the rooms in Stuttgart, sometimes made it challenging to hold group discussions.

The introductory and icebreaker sessions at the start of the events proved to be an efficient and entertaining way of preparing for an open discussion and reducing any potential social anxiety, especially for citizens. Because the questions for these icebreaker triads focused on what the participants had in common, such as hobbies or travel, they were able to take part in the informal discussion with an open and friendly attitude. As a result, important connections were established early on.

The program alternated frequently between work and discussion phases and included meals together and coffee breaks, which provided sufficient opportunities for people to meet randomly or get to know each other better. Nearly all of the scientists and non-scientists took part in the voluntary lunch and dinner at the end of the day of each event day, which revealed just how open-minded and curious they were.

Approval of the event framework and procedure

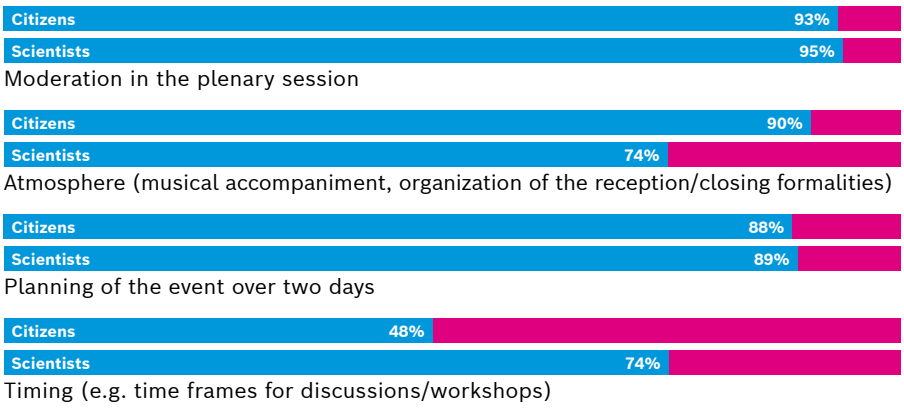


Figure: shown in blue, the values 1 and 2 on a scale of
1 = “very good” to 6 = “not good at all”
Question: Now let’s review the event framework of
“Science, Man!” How would you rate the following points?

Acceptance of opportunities for social interaction

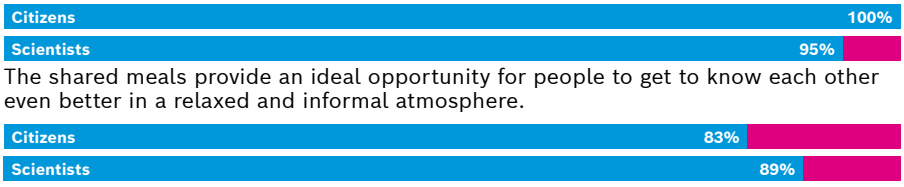


Figure: shown in blue, the values 1 and 2 on a scale of
1 = “I completely agree” to 6 = “I do not agree at all”
Question: How successful were the individual segments of the event in enabling an open and appreciative discussion among the participants?

The roles of the participants became blurred in the course of the event

In Stuttgart in particular, it was possible to break down the division of roles between citizens and scientists and both sides grew curious about the personal and professional backgrounds of the people they had just met. This happened even though the scientists who attended an introductory session at the beginning of the event had clearly identified themselves and also indicated their respective field of expertise. In the later workshops, which were held in new group formations, the background of the participants was no longer obvious. This also helped to break down hierarchies of expertise – partly because most of the scientists discussed issues outside the limits of their disciplines and certain citizens were able to take on the role of experts due to their professional background.

The time frame is good, some would like to explore topics in more detail

The participants generally found the predefined time frame over two days to be suitable and sufficient. The plenary session was thoughtfully moderated in a way that motivated participants and quickly established clear connections to the individual elements of the program. The moderating style was highly appreciated. Nevertheless, some citizens would have liked to have had more time to discuss certain research topics in more detail and to summarize the results of the workshops in the plenary session. For example, some would have preferred to conclude the day with a summary of the content and an outlook for the future instead of going back over the individual group discussions. However, as some participants themselves noted, this criticism was based on an overall positive impression of the event, which they found to be stimulating

with exciting topics. The program had already been revised based on the findings from the Essen event. Nevertheless, it might make sense to plan even longer time buffers so that individual workshops can be designed with greater flexibility in the future. Jumping from one topic to the next was definitely a challenge, especially for citizens with little scientific knowledge.

From specific research topics to overarching questions

Without any link to specific research topics and with only little guidance, the participants in Essen were barely able to reach the level of a rather abstract metadiscourse. Scientists and citizens remained somewhat disoriented and did not discuss the meta-topics as planned. The approach in Stuttgart was different: The plan here was for the participants to move from discussions on specific research topics to discussions on more abstract, overarching topics by using guiding questions and led by moderators. This approach worked.

The participants were already aware of the research topics to be discussed before the event in Stuttgart, and then there were keynote presentations given by the researchers. This gave the participants a chance to reflect on the topics, making it easier for them to discuss or bring up higher-level questions about scientific independence, credibility, and funding on the first day. As a result, a learning process was initiated, enabling discussions on a more abstract level on the second day.

A card game was planned in Stuttgart in order to highlight the common thread of the event. This was in itself a good and tactically useful idea, but given the tight timing of the discussions, the game was not really played, nor was it absolutely necessary.

The didactic structure was very effective. If it had been the other way around, probably no one would have said a word.
Scientist

We figured out important questions by ourselves, which made the card game rather unnecessary.
Citizen

Keynote presentations and moderation give structure to the discussions

Cycling in Stuttgart, vegetarian diets, or plastics: The topics defined for the first day of the workshops in Stuttgart offered an appealing selection within the context of current social developments. They are highly relevant topics to the lives of citizens and, in some cases, to the local area. This direct connection to research and science was reinforced by the involvement of the universities from the immediate vicinity. The keynote presentations given by the scientists about their own research fields provided a clear overview required for the subsequent discussions. They also allowed scientists to explain terms and organize contexts and facts for complex topics such as lobbying. The thematic workshops, guided by moderators, quickly led to balanced and appreciative discussions. They gave the citizens a chance to formulate their own demands on science and any misgivings they have about research, while also contributing their own expertise. On the other hand, they also gave scientists the opportunity to respond to questions or doubts and to present scientific values and methods.

Thematic workshops and card game, Day 1

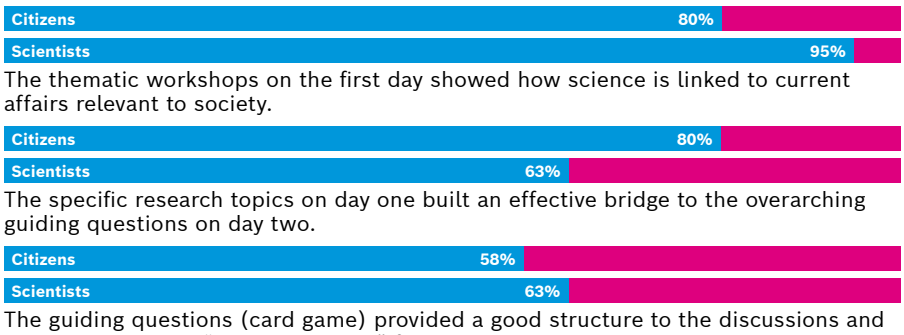


Figure: shown in blue, the values 1 and 2 on a scale of
1 = “I completely agree” to 6 = “I do not agree at all”
Question: How successful were the individual segments of the event in enabling an open and appreciative discussion among the participants?

Constructive working atmosphere in the working groups

Citizens

95%
The discussions were motivated and enthusiastic.

90%
Scientists who presented their research fields enriched the discussion rather than directing the focus onto themselves.

88%
The tasks were understandable and comprehensible.

88%
Citizens were able to effectively bring their own questions, experiences and perspectives from everyday (working) life into the discussion.

85%
Everyone was able to contribute to the discussion on an equal footing.

75%
The discussions were close to the everyday reality of the participating citizens.

Scientists

100%
Citizens were able to effectively bring their own questions, experiences and perspectives from everyday (working) life into the discussion.

95%
The discussions were motivated and enthusiastic.

84%
Everyone was able to contribute to the discussion on an equal footing.

79%
The tasks were understandable and comprehensible.

68%
Scientists who presented their research fields enriched the discussion rather than directing the focus onto themselves.

47%
The discussions were close to the everyday reality of the participating citizens.

Figure: shown in blue, the values 1 and 2 on a scale of
1 = “I completely agree” to 6 = “I do not agree at all”
Question: And how do you feel about the work in the working groups you attended on Day 1 and/or Day 2?

Overall, the discussions were conducted in a respectful way with little divisiveness. However, there were still rhetorical and technical language barriers and a tendency toward a strong disciplinary focus, which was also acknowledged by several scientists.

Guidance is important for the discussion on meta-questions

The second day of the meta-workshops focused on the overarching guiding questions of the event, such as the importance of science for democracy, how research results can be communicated, and how independent research is. In this context, reference was always made to the topics from the first day. This was particularly useful for the citizens. During the group work, some researchers took the lead on issues that were already related to their field. How participants rated a discussion therefore depended heavily on the composition of the respective group and on individual expectations. In addition, citizens in particular were uncertain as to how they could contribute during these workshops. In addition to a general introduction to the subject of meta-topics, they felt a need for moderation to provide guidance and structure.

Delving into the guiding questions, Day 2

On the second day, the guiding questions of the event were explored in-depth using interesting methods in workshops.

Figure: shown in blue, the values 1 and 2 on a scale of
1 = "I completely agree" to 6 = "I do not agree at all"
Question: How successful were the individual segments of the event in enabling an open and appreciative discussion among the participants?

Moderators were not available for the group work on the second day, but the representatives of the Robert Bosch Stiftung spontaneously took on the role, at least to some degree, once they became aware of the necessity. More consistent control would have been required here, especially when controversial discussions and one-sided opinions arise.

Many participants perceived the second day as more difficult, which was also due to the socio-political nature and higher level of abstraction of the issues that were discussed. Certain citizens needed to form an attitude toward these issues to begin with, while some scientists wanted to engage in more far-reaching discussions – for example, on the limitations of science. One conclusion could be that the specific research topics of the thematic workshops on the first day of the event offer an easier approach to more difficult, abstract questions.

Nevertheless, questions relating to science communication, the independence of research, or the social and political influence of science were found to be relevant and forward-looking. And: The majority of participants also found the related discussions interesting and stimulating.

"Science, Man!" brings people closer

Surveys and interviews reveal that the dialogue enabled both sides to gain new and nuanced insights – in line with the objective of "Science, Man!", which aims to help achieve a better mutual understanding through open discussions between citizens and scientists. Citizens in particular reported having learned and acquired insights on research topics that are important to them personally and, in addition, often have a practical value in their own daily lives due to their local relevance.[2]

It was important for the scientists to contribute too. Of course their contribution cannot be measured in the same way. But citizens were also able to provide background information, and everyone was a professional in their field.
Citizen

It can't be done without a moderator. The discussions need to be carefully and cleverly managed and moderated, otherwise you won't get to the point.
Scientist

Some people noticed that the way they express themselves is sometimes too complicated.
Scientist

2 One example of a successful transfer of knowledge into consumer practice is the discussion on where and how to obtain both animal-friendly and high-quality dairy products, in view of the latest research findings on livestock farming.

Interest in the given topics

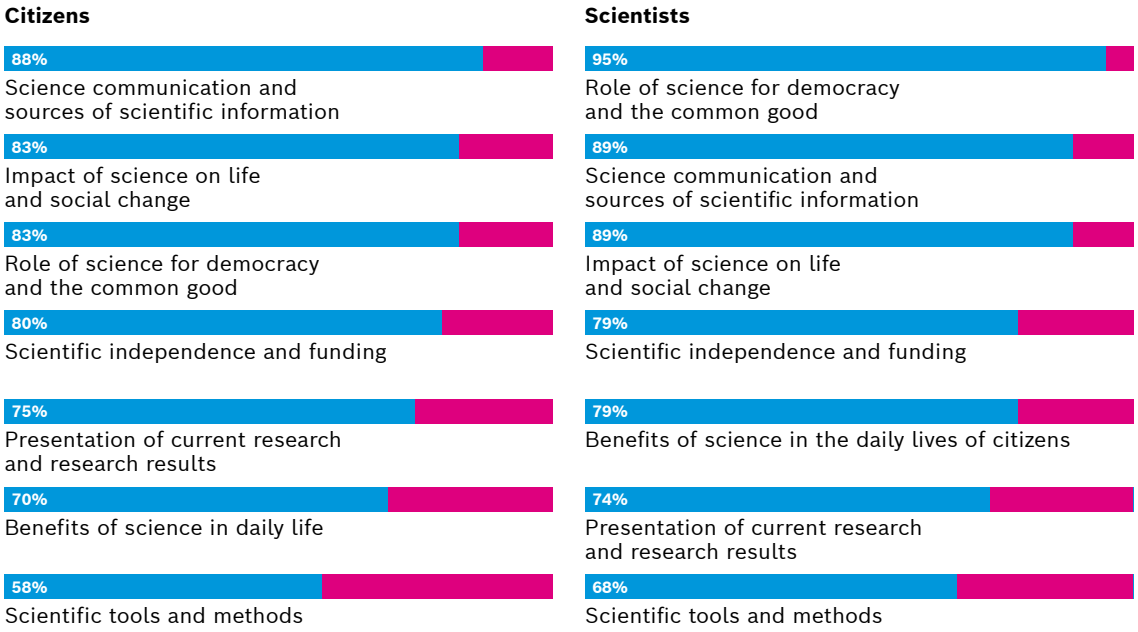


Figure: shown in blue, the values 1 and 2 on a scale of 1 = “very interesting” to 6 = “not interesting at all”
Question: How interesting did you find the information and/or discussions on the following topics at “Science, Man!”?

I had no idea about the day-to-day work of scientists before. I found it totally fascinating to be able to ask scientists explicit questions. It was extremely enriching.

Citizen

Above all, informal conversations during breaks or at group meals gave non-scientists the opportunity to ask more detailed questions about the researchers' day-to-day work. Even if the interest in this aspect in the surveys is rather moderate in comparison, the integration of specific discussion elements into the Stuttgart program provided access to scientists as "normal people" and brought everyone closer. Identifying professional commonalities, such as having to deal with limited financial resources, increases the understanding of the scientific apparatus and the respect for the dedication and effort that goes into research work.

Although some citizens' views on science and scientists still remain unchanged, this is because, on the one hand, they already had a positive image of them; in some cases, it was simply reinforced. On the other hand, many participants found that even with two days of discussions and working groups, there was not enough time and therefore "many key questions remain open".

Scientists also felt that their participation in the dialogue event was personally enriching, and were surprised by the sophisticated thinking behind the questions, reactions, and discussions. They saw the event as a first step in doing away with any misgivings about the "complex construct" of science by taking a transparent approach to questions on issues such as research funding. The researchers take methodological cues from this experience to apply to their own communication.

But more than anything, they feel encouraged in their commitment to science communication and have realized that science needs to communicate even more openly to society – even if a lack of incentive systems and support still make this difficult in practice. According to the surveys, many scientists found the observation that people quickly "lose interest when things get too complex" to be a useful insight from a practical standpoint. They also see a need to simplify the way research results are presented. At the same time, however, many believe that this would result in a risk of bias. The event reveals an overall critical view of the media, which is brought into focus in this context.

The image I had of it shifted to the positive, and I got over my resentment. It was nice to have encounters on equal terms and to have engaged in discussions.

Citizen

Individual effects of "Science, Man!"

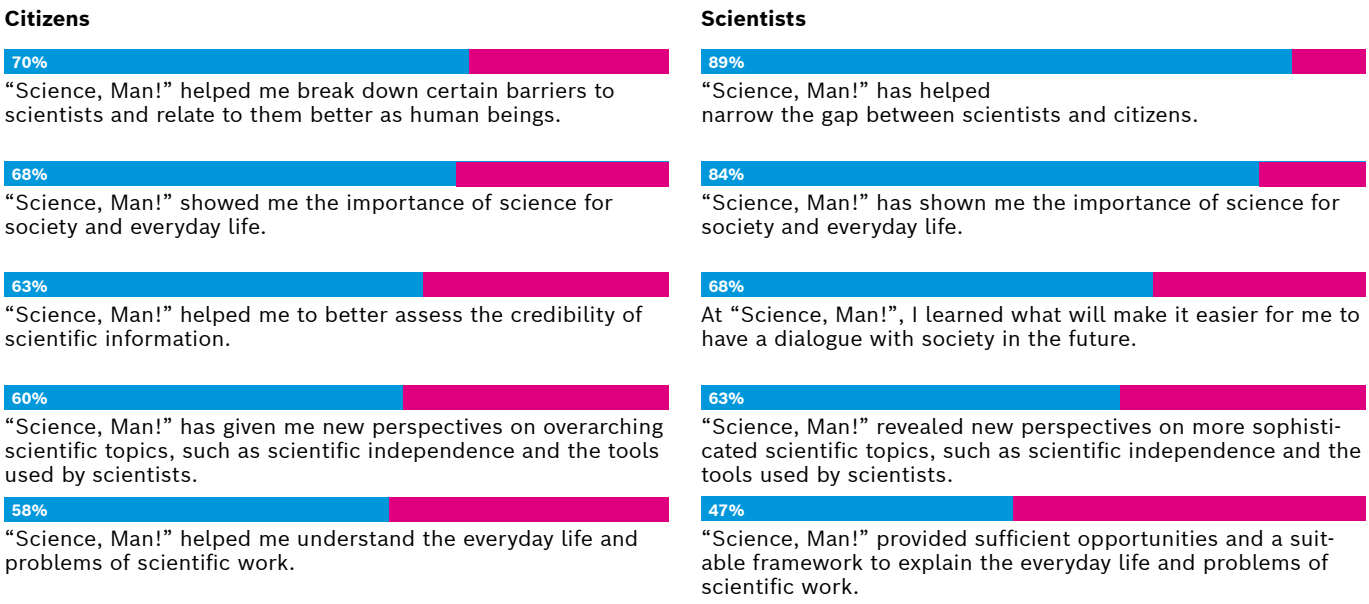


Figure: shown in blue, the values 1 and 2 on a scale of 1 = "I completely agree" to 6 = "I do not agree at all"
Question: Looking back, what did you get out of your participation in "Science, Man!"?

For the scientists, there were also interesting fundamental questions, answers and reactions that they don't otherwise notice. People got a lot out of it.
Scientist

A highly interesting event with a dialogic discourse! This provides important insights for university formats.
Scientist

Very willing to continue the dialogue

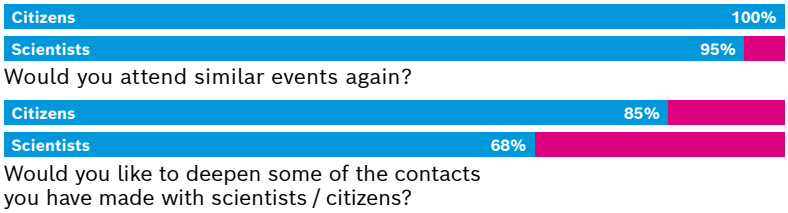
At the end of the two days, the participants were very willing to strengthen the contacts that were made during the event. This is an indicator of the high degree of willingness to engage in dialogue, but also of an event framework that uniquely favors communication and networking. Already in the final plenary session, participants emphasized the importance of "Science, Man!" as having provided the impetus "for more things to come". Participants expressed their appreciation for the coffee vouchers, which they were happy to accept as an "incentive" and have already been used by several of them for meetings in the initial weeks after the event.

Scientists can imagine using the format at universities

Could "Science, Man!" serve as a kind of blueprint? In the online survey, scientists believe that the format has strong transfer potential. Nearly all the scientists can imagine adapting it to their university and implementing it there as a way of contributing to the "third mission".

However, there is clearly a need to adapt the event concept to the resources and capacities of a university and to fine-tune the topics. This would be a way to reinforce the respective scientific focus, university strategy or research strategy, for example.

Motivation for further activities



Transfer potential of "Science, Man!"

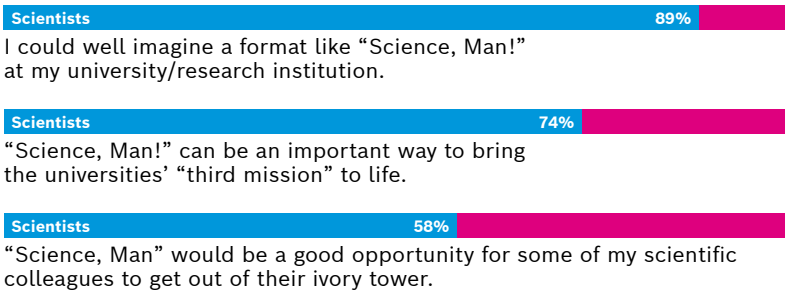
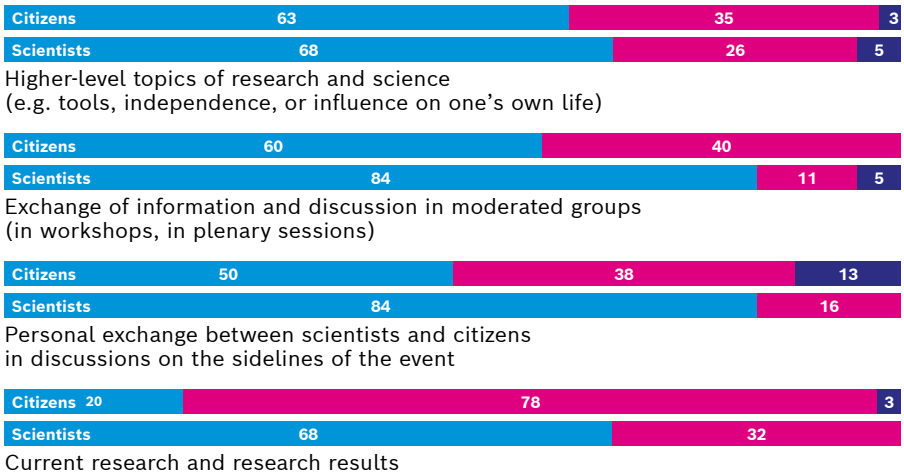


Figure: shown in blue, the values 1 and 2 on a scale of 1 = "I completely agree" to 6 = "I do not agree at all"

Weighting of topics and discussion opportunities



Figures in percent | ■ = just right, ■ = too little, ■ = too much
Question: How do you feel about the weight given to the topics and the opportunities for discussion and debate?

The combination of topics and formats during the event was considered to be coherent for the most part. However, citizens would like to have received more information on the specific research topics.

Individual learning effects of “Science, Man!”

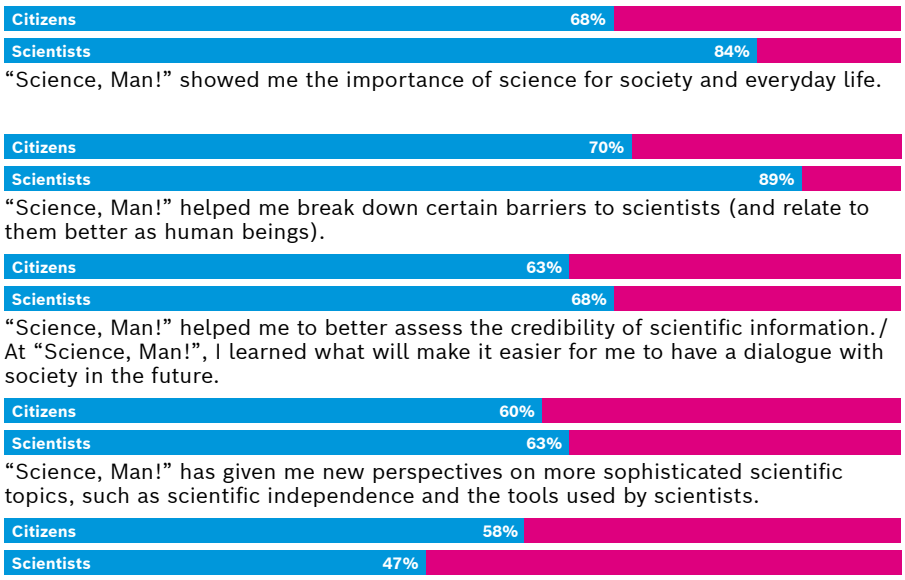


Figure: shown in blue, the values 1 and 2 on a scale of
1 = “I completely agree” to 6 = “I do not agree at all”
Question: Looking back, what did you get out of your participation in “Science, Man!”?

Both the citizens and the scientists acquired learnings and positive results from the dialogues. However, the scientists overwhelmingly felt that they were unable to communicate the real challenges of everyday scientific work.

Different focuses on topics and goals

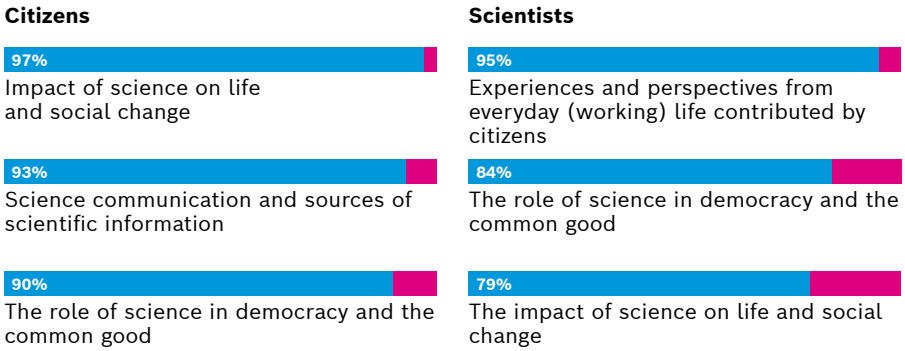


Figure: shown in blue, the values 1 and 2 on a scale of
1 = “very important” to 6 = “not important at all”
Question: How important are the following topics or aspects to you in principle when science and citizens exchange views and hold discussions?

In assessing the most important topics for the dialogue between the scientific community and society, the participants focused on different things.

Discussions among equals in the workshops

Everyone was able to contribute to the discussion on an equal footing.

Scientists who presented their research fields enriched the discussion rather than directing the focus onto themselves.

Citizens were able to effectively bring their own questions, experiences and perspectives from everyday (working) life into the discussion.

Figure: shown in blue, the values 1 and 2 on a scale of
1 = “I completely agree” to 6 = “ I do not agree at all”
Question: And how do you feel about the work in the working groups you attended on Day 1 and/or Day 2?

In the workshops, a discussion among equals was usually possible without a scientist or citizen dominating the conversation.

Events like “Science, Man!” are important for reinforcing the credibility of science in society.

Figure: shown in magenta, the values 1 and 2 on a scale of 1 = “I completely agree” to 6 = “ I do not agree at all”

I expect this event to be a defense of science, its flaws, weaknesses, and shortcomings. I had to think it over for a long time whether I wanted to participate. I was more inclined to say “no” rather than “yes”. My negative attitude toward science made me want to turn it down. I finally decided to do it so that I could give it a good bashing.

Citizen (Friday, before the event)

It is very, very important that this kind of event exists. Citizens and scientists have so many things they need to clear up. These issues need to be reconciled. This can only be done through dialogue and when people talk to each other. Whoever invited us, all I can say is that it’s great. Excellent. Rating: Summa cum laude.

The same citizen (Saturday, after the event)

Toolbox

Good planning is half the success

PREPARATION

The success of an event essentially depends on how well it was prepared. It is important to involve the relevant stakeholders in your organization early on in order to benefit from as many resources as possible and gather internal support. All participants will be able to tell how important an event is to their own institution. Additionally, in discussions with other people and departments opportunities often arise that were not apparent before.

Many things should be considered or even started during the preparation phase so that they don't take too much time in the follow-up phase. This includes documentation and evaluation, for example. There are undoubtedly different approaches to structuring the tasks. The points listed below can therefore be set in a different chronological order.

Management approval and budgeting

First of all, it must be determined whether the appropriate management level will support the event and whether there is any available budget for it. It is already a big step forward, once management has been convinced. Of course, the financial framework must also be clear before anyone can be commissioned to assume the project management for the event.

Define responsibilities

It is recommended to select one person to be in charge for the event, who will act as a single point of contact. Depending on the organization, this may be a representative of the university communications or marketing department or someone from the transfer department. In addition, the rector's office and the dean's office or heads of the specialist departments should act as supporters to contact the scientists and invite them to participate. Depending on the capacities of the specialist departments, contacting citizens, documentation, evaluation, or the moderation of the event can also be handled using "in-house" resources.

Tasks and responsibilities should be assigned clearly. A kick-off meeting with all stakeholders can help get things rolling with the event organization: a measure that brings everyone on board, promotes internal community building and helps increase the team's sense of ownership for the project.

Rooms, schedule and work phases

Which rooms should be used for the event? Is technical support required? This will depend on how many participants are invited in total, the number of small groups that are planned, and where the event will be catered. The accessibility of the room for the citizens is also an important consideration. It is recommended to work with small groups in separate areas rather than in the same room. The noise level from other activities should be limited so that the participants can concentrate on their work.

A rough time schedule or production schedule should be used to define the key work phases, to which deadlines, milestones, and responsibilities should be continuously added as the event draws near. Clearly defining and setting a deadline for each objective will make it easier to avoid misunderstandings or overlook any elements.

Selection of participants (scientists, moderators, citizens, other persons)

When selecting scientists, the aim is to achieve a good mix of different career levels and disciplines with an equal gender balance. A proven successful approach is for the rector's office or specialist department managers to contact the scientists. The invitation to "Science, Man!" included general information on the objective of the event and the scheduled program, a registration form, data protection information, and an offer for them to provide a workshop themselves. The scientists were given the opportunity to specify a topic relevant to society for a talk that they would give. A selection of different fields and topics was put together from the wide range of topics that were proposed. After selecting the topics, we had a discussion with each person who could potentially provide input to assess whether the topic was socially relevant, establish a common understanding of the topic, and to clarify the role of the input providers at the event.

The choice of moderators depends on the resources available. Suitable moderators can be identified internally and assume the role (e.g. students with moderating experience), or one or more external moderators can be taken aboard.

It is advisable not to start recruiting citizens too late so that there is still time if changes need to be made (see page 72). Are there any other people who should attend the event? Representatives of the university president/rectorate, the deanery, the city, the ministries? Important figures should be informed as early as possible so that they can save the date. Citizens should be encouraged to register for one of the presented research topics with two priorities when they receive the invitation. This will allow the thematic workshops to be divided evenly.

Documentation, evaluation and goody bag

The event should be documented and evaluated for transparency, verification of desired and actual results, and communication purposes. As mentioned above, these work packages could be taken on by the relevant specialist departments. Alternatively and depending on the budget, photographers, science communicators, and evaluators can also be commissioned.

"Preparation" checklist

One year in advance

- ☐ Seek support from managers and clarify funding and who needs to be informed?
- ☐ Define responsibilities: Who can assume which role/tasks and who needs to be informed?
- ☐ Draft a rough schedule: Which work packages need to be implemented when, and by whom?
- ☐ Create the activity and cost plan
- ☐ Book rooms

More than six months in advance

- ☐ Determine data protection requirements
- ☐ Draft and start evaluation concept (optional)
- ☐ Draft documentation concept
- ☐ Design participant recruitment process
- ☐ Develop agenda: Program of the event including breaks, time frames and room allocations
- ☐ Contact the participants: Scientists, moderators, and other participants

Several months in advance

- ☐ Start recruiting citizens
- ☐ Reserve technical equipment and catering
- ☐ Invitation and participant management
- ☐ Plan participant assistance on-site
- ☐ Decide on the "look and feel" of the event: What is required in terms of decorations, furniture, lighting, music, etc.?
- ☐ Research and prepare goody bags for scientists and citizens

Just before the event

- ☐ Detail and production planning for all technical crews involved
- ☐ Compile material list
- ☐ Brief moderators and those providing input

Create the best framework conditions

IMPLEMENTATION

The big day has finally arrived. Now it is time to reap the benefits of months of preparation and make the dialogue event a success. To do this, two things are required: Every detail of the two event days must be meticulously planned, and at the same time, the plan must remain flexible and open for unforeseen events. The first is needed to ensure a stable structure and keep everything in line if things get hectic. But "Science, Man!" is a very dynamic format that relies heavily on the interaction between people who are just getting to know each other. It should therefore allow things to take their course. For this reason, it may be necessary to make small but significant adjustments in the middle of the event. Here are some tips to help you get ready for the two days.

Teamwork with clear responsibilities

The two events in 2018 and 2019 have shown that a team size of around eight people is optimal for running the event on site. This is would apply if the full scope of "Science, Man!" is implemented. In this case, a film team or external evaluators would be supervised and all parallel workshops would be documented at the same time, if possible. If not, fewer staff will be required. However, the following applies overall: The more people who represent the host institution and are available for ad hoc tasks and informal discussions with the guests, the better. Student assistants can help the on-site organization team; they are more than happy to be involved, and are more familiar with the subject than externally commissioned staff.

The individual tasks can be defined and assigned as responsibilities and given a time frame in a detailed production plan. It is also recommended to designate persons responsible for tasks that need to be carried out during the entire event. This includes organizational support for the moderator, contact persons for catering and technical equipment, assistance for VIPs, contact persons for photographers and film teams, and runners for ad hoc tasks.

Atmosphere of well-being focused on the essentials

In addition to a well-structured program and interesting work assignments for the group discussions, a good conversational atmosphere is an important success factor. Make sure that the guests feel at ease: Welcome them with a small chocolate as an ice-breaker. Name tags that do not mention professor or doctorate degree titles help avoid creating an artificial distance between scientists and citizens. During breaks, seating in small groups, pleasant lighting, and suitable background music can help get conversations going quickly. If the dinner is served as a buffet, there will be various opportunities during the evening for each participant to converse with different people.

Experience has shown that an extensive framework program or special occasions and activities are not necessary. Table football games, Polaroid cameras for souvenir photos, and experiment stations were tried in the past and not particularly well received. On the contrary, they distract participants from what is important – good conversations – and are therefore better left out.

Learning during the event

"Science, Man!" is very different from the established event formats in which scientists usually participate. There are neither long lectures nor panel discussions. Instead, all participants are in motion, and new constellations of conversations are constantly emerging. For a first-time event, it is unlikely that everything will work out as planned. This makes it all the more important for the organization team to take active part in the event and document it as detailed as possible. For example, find out in advance who is attending which workshop and writing down their observations. It has been shown to be effective to schedule time for team meetings during the breaks. A briefing is recommended shortly before the guests arrive. A debriefing at the end of the first day of the event is also important: What went well, and what didn't? Based on the learning experiences of the first day, the second part of the program can now be adapted, for example, by reformulating individual work assignments or guiding questions. Even after the event is over, the team should meet again to get an initial summary while impressions are still fresh.

Part of learning also means knowing how to react with flexibility to things that arise from the dynamics of the event. It might be a good idea to hold a plenary session

standing up so that the chairs need to be moved aside quickly. Or certain participants may require special assistance because they do not feel at ease. Or maybe a self-directed group discussion fails to get off the ground and someone from the team needs to jump in spontaneously to moderate.

Photograph, document and evaluate

Ensure that the documentarians and evaluators have enough space for their equipment and that there are also nooks where interviews can be conducted and someone can take notes during the event.

"Implementation" checklist

- ☐ Be at the venue early enough so that you have enough time to set up and perform an equipment check
- ☐ Display the program visibly in several places
- ☐ Estimate walking distances and allow sufficient time for people to change locations (e.g. from the plenary to the workrooms)
- ☐ Plan to hold a briefing with the entire organizational team
- ☐ Have the main moderator hold a final briefing for the workshop moderators and presenting scientists.
- ☐ Reception and registration of participants, preferably at three counters according to letter group, e.g.: A–K, L–O, S–Z
- ☐ Offer a welcome coffee
- ☐ Depending on how the rooms are set up, deploy the team members to show guests the way to the coat check, the plenary, etc.
- ☐ Arrange some chocolates to welcome the guests or hand them out in person
- ☐ Ensure strict time management: Announce the end of the individual program sections by sounding a gong, bell or other signal
- ☐ If possible, have team members or an external service provider document all parts of the event
- ☐ Plan a debriefing with the team after the first event day
- ☐ On the second event day, distribute and advertise postcards for networking

Think of the end right at the start

FOLLOW-UP

As mentioned at the beginning, the follow-up session begins before the event. This is because everything that needs to be done after the event should be carefully planned in advance.

For example, written material texts can be drafted and research can be carried out. This saves time during the phase right after the event, during which there are typically many administrative tasks and "loose ends" to tie up. The project team may need to move quickly and efficiently to the next appointments and events.

The momentum generated by a successful dialogue event must be kept going, and it is therefore important to take the follow-up session seriously. A good follow-up offers the opportunity to build an internal and external community that may become the nucleus for more networking, better discussions, and a diversification of dialogue partners. It is important to

- make detailed observations during the event and to ask questions,
- inform the participants about the initial results in a review
- keep the memory alive with the help of engaging documentation,
- obtain participant feedback and
- summarize the learnings as part of an evaluation and pass them on to the project team, to your own institution, and also to the participants.

Organize and collect

While the experiences are still fresh in people's minds, they should be collected, compiled, and documented in writing or in visuals. The best way to do this is to conduct a feedback session on site during or immediately after the event. All those involved, from the conference management, moderators and project management to the auxiliary staff or the photographer, will have information and impressions; it will only become clear which are important and relevant after taking some distance. The diversity of perspectives is essential. Quotes or statements that have remained in people's minds, questions and, above all, conflicts or problems can be especially helpful for the documentation or even an upcoming event.

Review for all participants

At the event, you learned what the citizens find interesting, but also how the participants might want to get (more) involved. Now you can address those needs specifically. Whatever ideas or information from the event you have to share – information researched in advance, answers to specific questions, in-house expert lists or the announcement of the next university events open to the public – send them to all the participants, not just the citizens.

Documentation

The observations of the project team or a commissioned "documentary" and the pictures, videos, interview excerpts, quotes, and photo log of everything that happened in the workshops can be used to put together engaging documentation. This will allow you to visualize the different perspectives of the various participants and also the overall mood and moments of realization for the participants and the public, thereby making them more relatable. This can help the university become more open, enhance its image, and generate curiosity internally and externally – or make people want to participate next time.

Evaluation, impact, and learnings

The dialogue event does not necessarily have to be evaluated professionally and externally. An anonymous online evaluation can be carried out free of charge and is quite straightforward to do on your own. The information on page 76 can help with the design. The results of the survey and, above all, critical feedback, suggestions, and questions in free text fields must be shared as learnings with the project team – and with the university in a suitable form. The structured collection of comprehensive feedback shows all those involved, from citizens to university management, that a dialogue is not an end in itself: It's about learning from each other. If you haven't already

Questions for planning the follow-up

- Who will research and design text templates for the review?
- Who will document the event and how?
- Who can participate in the feedback session?
- Who is responsible for concept development, implementation, and preparation of the evaluation?
- Who will be responsible for agreements with service providers and coordinate or write and design the documentation?
- Who will be the contact person for the participants and assume the task of community building in the future?

done so, you should also take into account your first impression of the event. Based on this information, you will be able to tailor your community and communication work more precisely in the future.

Community building

Ideally, the dialogue event will inspire a group of around 75 different people who have had more than just a common experience: Some participants will have met again several times, others will now find out more about science or discussion formats, and others will have attended an event at your university for the first time. And the participating scientists will also talk about the format and discussion with their colleagues. “Science, Man!” offers many reference points that you can leverage to maintain the link to your university over the long term, following the “Talk together. Learn from each other” approach. It doesn’t have to end here.

“Follow-Up” checklist

Right after the event

- Gather the first impressions of the team members
- Feedback session with moderators
- Agreements with photographer, film team, other service providers
- Feedback session with evaluators
- Feedback session with the rectorate (if applicable)
- Return documents and materials
- Press interview

First week after the event

- Research specific information on questions that arose at the event
- Thank you email to participants with prepared information material and inquire about interest in networking
- Thank you email to moderators, input providers and, if applicable, participating partner institutions
- Compile image and documentation material
- Press review
- Fine-tune the online participant survey

Second week after the event

- Send an email with contact details/ distribution list of people interested in networking
- Send film and image material to participants or post a report on website
- Invoice handling
- Online participant survey
- In-depth qualitative interviews of the evaluators

Medium term (community building)

- Prepare and send evaluation results to participants and internally
- Include participants in newsletters and distribution list
- Special invitations to relevant events
- Inquire about questions, suggestions, interests
- Organize rooms for a follow-up meeting with the participants of the event
- Organizational support for follow-up meetings

Triads

Title of the module

Triads

Main goal

To allow participants to get to know each other

Objectives/results

Participants get to know each other in mixed groups of three. Participants learn about the interests, place of residence, hobbies, career history, vacation plans, etc. of the others and find out what they have in common.

Duration/procedure

Duration: 30 minutes

Procedure: Sitting in a circle, two people interview the third for ten minutes each. Each takes a turn until they have all been interviewed.

(Moderation) method or task

The moderator in the plenary session briefly introduces the task. Flip charts can be used to present guiding questions that will help get the conversation going, e.g.

- What is your name?
- Where do you live?
- What is your favorite vacation spot or where would you like to go on vacation?
- What is your favorite activity or maybe even your passion?
- What questions about science are you particularly interested in and why?

Alternatively, these questions can also be distributed to the participants on interview sheets.

The groups of three (one scientist, two citizens) get together, take three chairs each and look for a spot in the room. No moderation is required for the reciprocal interviews. The moderator in the plenary session keeps an eye on the time and gives a signal for the start and end of the interviews

Evaluation

Participant survey during or after the event.

Participants/material/ resources

- Moderator for introduction, scientists, citizens
- Poster with bullet points for possible questions that may be asked during the triads. Alternatively: The interview questions are printed on paper to be distributed to the groups.
- Large room where you can sit with chairs in small groups of three.

Thematic workshop

Title of the module

Thematic workshop

Main goal

Input and exchange of ideas on a scientific topic related to a current social issue

Objectives/results

Providing information to the citizens, creating a common basis for discussion, establishing scientists as experts, presenting a specialized area, gathering citizens' substantive questions.

Scientists will learn how laypeople perceive (their) research, what sparks interest, what are the priorities from the citizens' perspective, where are barriers in communication, and what are the reasons behind problems of understanding and distorted views. Ideally, they will realize that the layperson's perspective can enrich their research.

Duration/procedure

Duration: 75 minutes

1. Keynote speech by the scientist (15 minutes) based on the following structure:
a) My research topic and key questions
b) How is the topic perceived in society/research/media?
c) What would you like to know from non-experts?

2. Collect and record initial answers to c) and other questions (20 minutes)

3. Discuss results (40 minutes) Moderator reads out the results, experts comment, joint discussion; afterwards: presentation in plenary session

(Moderation) method or task

A moderator mediates within the heterogeneous group, initiates the dialogue, monitors speaking times and linguistic comprehensibility, paraphrases statements if necessary, and documents the results and questions in the discussion on a metaplan board.

Evaluation

- Feedback session with moderator at the event
- Online survey of all participants after the event

Participants/material/resources

- Scientists, moderators and up to 13 citizens
- Poster or sticky notes with key points of the scientific input
- Closed room for up to 15 participants
- Metaplan board and moderator's toolkit

Tips and tricks

- Student moderators are good mediators and can try out their skills in the format
- Plan for a detailed briefing by scientists and moderators (see page 74)

Telling the inside story

Title of the module

Telling the inside story

Main goal

Scientists use six guiding questions to impart system knowledge in addition to answering questions about their field of expertise and their day-to-day work.

Objectives/results

To visualize the individual's knowledge of "science" as a system and the way citizens view research/scientists. Preparing the meta-workshops. Scientists learn how laypeople perceive (their) research, what sparks interest, what are the priorities from the citizens' perspective, where are the obstacles in communication, and what are the reasons behind problems of understanding and distorted views. The citizens develop an interest in the way scientists work, their role in the science system and the functioning of the system, and can decide which guiding question interests them.

Duration/procedure

Duration: 30 minutes

Procedure: In triads from the previous day (two citizens each with a scientist), the small group exchanges information about the guiding questions and the day-to-day work.

(Moderation) method or task

The moderator calls for the coffee break to be spent in the triads from the previous day and for the participants to discuss the guiding questions and other questions.

1. How do the tools of science work?
2. How independent is science and who finances it?
3. How does science change our lives and who benefits?
4. Where can you find information and what does science communication achieve?
5. What is the role of science in democracy and the common good?
6. (How) can science solve my problems?

Evaluation

- Questions from the moderator in the plenary session to everyone about what they found surprising, what stood out, what they got out of it
- Online survey of all participants after the event

Participants/material/resources

- One scientist and two citizens per group
- Room and coffee

Tips and tricks

During a coffee break, assign the task of consciously discussing the day-to-day work: What is most fun? What are some typical problem areas?

Meta-workshops "behind the scenes of science"

Title of the module

Meta-workshops "behind the scenes of science"

Main goal

Discussion of key issues that touch on overarching themes in science.

Objectives/results

Citizens acquire meta-knowledge of science as a system in terms of a basic scientific education ("Scientific literacy"). Examples of topics: Rules and methods for pursuing knowledge, funding, quality assurance, science communication, limits of research.

The scientists do educational work and share basic knowledge about their activities. They find out what image the citizens have of them and what is expected from them. They reflect on their role in society.

Duration/procedure

Duration: 105 minutes

1. Moderation in the plenary session. The participants assign themselves to the six guiding questions according to their interest. (15 minutes)
2. Flash introduction to the individual workshops: Each participant writes down one aspect of the guiding question on a sticky note and presents it to the group. (15 minutes)
3. Delve deeper into the questions/topics in the dialogue while visualizing them with sticky notes (30 minutes)
4. Prepare the presentation for the plenary session: Record results and findings and select key points. Form a pair of citizen plus scientist to present them. (15 minutes)
5. Presentation in the plenary session, three minutes per group (30 minutes)

(Moderation) method or task

One moderator per group initiates the dialogue, monitors the speaking times, and documents the results.

Evaluation

Participant survey during or after the event

Participants/material/resources

- Maximum 15 participants, at least one scientist per group
- One separate room per group if possible
- Metaplan board and moderator's toolkit

Tips and tricks

- Work steps should be given to each group in the form of sticky notes
- Flash introduction also encourages reserved participants to get involved
- Student moderators are good mediators and can try out their skills in the format
- The format for guiding questions is best prepared with thematic workshops and the module "Telling the inside story."

Create diversity

EXPERIENCES FROM RECRUITING CITIZENS FOR "SCIENCE, MAN!"

One of the key challenges was to find citizens from different areas of society for the event with the aim of putting together a diverse group of participants. If we had used standard methods such as sending flyers or putting up posters in public areas, we would have only reached people who are already interested in science. However, the aim was to attract people who have little or nothing to do with science in their everyday lives and who would not have signed up for an event with scientists on their own accord. The project team discussed several possibilities for assembling a diverse group of participants – for example, directly approaching passers-by in the pedestrian zone or recruiting participants among acquaintances. The best approach seemed to be to hire an opinion research institute to recruit fifty randomly selected citizens for "Science, Man!" according to predefined participant profiles.

Participant profile

For "Science, Man!" in 2019, recruiters searched for 50 adults from the Stuttgart region who are not active in science.

The selection criteria for the citizens were:

- Gender: female/male/other
- Age groups: 18–30 years/31–45 years/ 46–60 years/60 years and older
- Education levels: very high (university degree)/ high (high school diploma, no post-secondary studies)/ medium (secondary school level) / low (lower secondary level or non-graduate)
- immigrant background/non-immigrants
- working and unemployed/ employed and freelance

Methodological approach

Citizens were recruited by telephone via random sampling and postal inquiries using part of a citizens' registry log from the city of Stuttgart.

If a well-mixed composition of the target groups were not achieved through the telephone calls and mailing, an additional recruitment method would be to approach passers-by in the pedestrian zone or to contact youth clubs, sports associations, and other organizations in the city. This recruitment method may also be used rather than the option of hiring an opinion research institute. One big advantage of direct contact with passers-by is that immediate feedback is received and the targeted composition of participants can be adapted on the spot while recruiting in the pedestrian zone.

Another option is to recruit citizens among acquaintances. To do this, several people in the project team look for potential participants in their own circle of acquaintances that meet the above criteria: the salesperson at the bakery, the senior next door, a friend of a friend, etc. This method has already been successfully used for an upstream focus meeting.

Information management for approaching candidates

During the recruitment process, potential candidates were first given an explanation of the aim of the event and the framework conditions. If a person showed interest, the research institute took the contact details and sent information materials. These included a registration form, which the potential candidates could use to register with no obligation. Potential candidates could register online via a registration tool; alternatively, they could also send a response by post or by email. The opinion research institute

was responsible for managing the registrations.

From among all the people who expressed interest, the opinion research institute put together a mixed group of participants according to the above criteria.

Four weeks before the event, the potential candidates were informed by the opinion research institute whether they had been selected for “Science, Man!” or placed on a waiting list. The selected citizens were then able to register for “Science, Man!” and commit to participating. They could also indicate their preferences for two out of six thematic workshops, so that they could be assigned to the different workshops according to their interests.

Together with the confirmation of participation, the citizens received additional information on the procedure and final organizational information two weeks before the event. If there were cancellations, people were taken from the waiting list.

Schedule and work phases

The following work phases were scheduled in advance with the opinion research institute:

- Preliminary work (create a random sample, program recruitment guidelines, coordinate the quota plan, train the telephone interviewers)
- Recruitment (telephone interviews, letters, on-site appointment in Stuttgart if required)
- Send information materials to potential candidates including registration deadline
- Administration of the statements of interest, comparison with the quota plan, continuous adjustment of the samples in order to achieve the improved distribution of the characteristics.
- Put together the participant group according to the selection criteria
- Inform all candidates whether they have been accepted, put on the waiting list or declined
- Collect binding registrations and workshops preferences
- Send the confirmation of registration and the latest information on the event
- Weekly updates on the status of registrations

Ensure productive discussions

WHY GOOD MODERATION IS KEY

For a successful discussion on equal terms between scientists and citizens, effective moderation of the discussion processes goes a long way. Moderators have three main tasks:

1. With the help of a clear timetable, they ensure that the overall process is designed reasonably and efficiently.

2. They guide the group during the discussion according to its special dynamics, let the discussion go on as long as it remains purposeful and constructive, and intervene to correct its course if it becomes unproductive.

3. They steer the exchange of information and keep it open-ended by asking questions, using visualizations and moving the conversation forward.

So while the moderator focuses on the HOW, the participants can exchange ideas about the WHAT. To achieve this, various tools are available to the moderator:

- Coordination following a defined procedure with clearly delineated sub-steps,
- working within a specific setting,
- setting distinct content priorities according to a structure and
- agreeing on rules for working together effectively.

Reduce uncertainties by setting clear targets

The use of the tools helps develop the content systematically. But more than that, it also ensures that people know how to behave at the social level. Clear methodological guidelines give everyone a concrete idea about what they need to do. Everyone is aware of their contribution and knows in what form they can provide it. In a group setting, it is not always possible to tailor conversations to the individual needs of each particular person. However, with effective moderation, a group can get to a point it would not have reached on its own. If it succeeds, it also convinces skeptics and solitary people when they see how well it works with support from a moderator.

Skillfully steer group dynamics

The deliberate use of the steering tools can change disruptive communicative habits. Depending on what is required, more or less time can be allocated, greater focus can be given to certain contributions, or their many layers can be further explored in more detail. With support from a moderator, people who tend to talk more are given limits and those who talk less are encouraged to participate. The effects of group dynamics can be channeled. In this way, an unproductive discussion can be replaced by another form of dialogue.

Give a good structure to the overall process

The process is structured by defining a standard procedure, defining clear objectives (What is the next step about? What is it not about?) with timing targets specifying when each work phase will transition into the next phase. This ensures that all the participants return to the plenary session on time, even if several small groups are active in parallel.
Pre-defined structures, which can be populated in various ways in terms of content, are useful for preventing one-sided discussions that get out of control. This helps everyone keep track of the situation together while still achieving nuanced results. If the discussion is given additional structure by consistently visualizing it on flip charts or large paper-covered boards, critical comments and questions can also be noted and addressed, which further adds value.

Set realistic times and allow enough buffer

It is important to plan adequate buffers, especially when managing time for large groups. It takes time for people to form groups, move chairs, switch rooms and bring results on pinboards back to the plenary. Short presentations in the plenary should be limited in time; three minutes per working group is usually enough to summarize the essentials in the plenary; after all, the entire discussion from the small group should not be repeated in the plenary as a long-wind-

ed narrative. This ensures that the subgroups presenting last at the plenary session will also receive attention.

Brief co-moderators before the event

If you are working with several moderators, a quick briefing before the event is essential for them to understand: What is the goal? What is the overall framework? Where and when is the mini workshop or the module? What are the objectives at certain points? What kind of result is needed to be able to continue working effectively in the next phase?

Evaluate the event in a meaningful way

GENERAL PRACTICAL NOTES ON SELF-EVALUATION

Evaluation is generally scalable and should be based on the subject matter, the available resources, and the objectives of the measures, and verification of whether these objectives have been achieved. If you take the objective derived from an understanding of the problem for "Science, Man!" of counteracting the scientific community's loss of credibility in society, it is extremely difficult to verify it directly in any meaningful way.

Immediate goals (output), such as enabling a discussion between citizens and scientists on equal terms, or impact goals beyond the event (outcome), such as increasing mutual understanding among the participant groups, make much more sense and are easier to verify. Achievements and directly related goals (output) can be effectively documented: Which activities were provided? What was the scope of the activities? How many people made use of them and from which target groups? Were they well accepted? The same applies to the recording of the resources that were used, such as employee hours or time spent (input).

In addition to an external evaluation, "Science, Man!" also a conducted a practicable self-evaluation with evaluation elements integrated directly into the event and event management: Coordination sessions were held with the project participants in between event segments in order to further coordinate the events but also to capture systematic impressions from the perspective of different actors on aspects such as whether certain target groups had been reached, the acceptance of the event, or to optimize certain modules. In addition, participant feedback was integrated into the process using methods such as question cards that were then discussed in the plenary session. Furthermore, feedback sessions were held with participants during and after the event.

Methods: it's the combination that counts!

Methodological approaches for (self-)evaluation of dialogue events can be roughly divided into four categories:

- (Online) surveys or (guided) interviews (on-site or by telephone)
- Observational procedures (for example, participatory observations or peer reviews from invited "experts" on similar event formats)
- Feedback elements at the event (for example, feedback rounds in the plenary session or sticky note walls)
- Document analysis (for example, analysis of media reports or reactions in social media)

Since each method can only represent one part of the experience, it is helpful to use a combination. In addition, a combination of methods reveals the weaknesses of individual procedures (method triangulation).
For example, quantitative methods such as surveys with standardized questions may be suitable for measurements and provide corresponding factual results based on figures, but they only rarely give reasons and/or explanations for the participants' deeper motivation.
The latter offers mainly qualitative approaches such as guided interviews, in which participants can explain their evaluations in detail through their own questions and inquiries. However, due to the amount of work involved and the consequently smaller sample size, the results rarely apply to the entire field of participants.

What types of questions should be answered?

Before choosing any specific methods, it is important to determine which are the guiding questions and objectives and which indicators are suitable for their evaluation.
Quantitative indicators can be well expressed in numbers and are particularly suitable for measuring target variables (for example, satisfaction or willingness to engage in follow-up activities).
Qualitative indicators, on the other hand, help to explain either quantitative results (What is the reason behind the (dis)satisfaction?) or to explore questions that are difficult to formulate as hypotheses and statements (How has the image of science changed?).

Two approaches to self-evaluation

The choice of method depends on the available resources and on the extent to which individual approaches can be integrated into the implementation of the event without disrupting its progress. It therefore helps to distinguish between two sets of methods that build on each other:

- Basic set: Combines easy-to-integrate feedback elements and creative techniques with participatory observation
- Quantitative-qualitative exploration: An online survey and/or qualitative guided interviews in addition to the basic set

The basic set already provides valuable information on the quality of the implementation and the satisfaction of the participants. It can be implemented in a simple and entertaining way. The addition of a quantitative-qualitative element requires more extensive preparation (questionnaire or guideline development, programming, recruitment of participants, etc.). At the same time, it must be carefully designed (What are the key questions? How can these be measured or put into hypotheses?). A comprehensive, understandable and, above all, (statistically, if possible) reliable representation of the event can be obtained in this way.

Feedback elements and creative techniques

The following techniques can be used to obtain feedback from a larger number of people without too much effort:

- Moderated feedback session in the plenum at the end of the event (What worked? What needs improvement? What did you get out of it?)
- Voting by nomination, sticky dots (e.g. on flip charts), or by stomping feet
- Use of sticky notes on walls (can be ideally combined with breaks or waiting times)

Participatory observations (category-based)

- Observation of the event and group processes (ideally) as a passive participant in the background or as an active player
- Particularly suitable for the analysis of communication and interaction behavior in discussion groups or workshops
- Benchmarking how well the actual implementation of the event follows the originally planned schedule
- Structuring of observations and impressions using a category diagram (which differentiates between framework conditions, group processes, participant reactions, etc.)

Standardized online survey

- Suitable for quantifiable goals and indicators
- Cost-effective method for involving all participants
- Contains standardized questions so that it can be used multiple times, which allows results to be compared over several events
- It is now easy to implement on your own with user-friendly, free online tools (for example, LimeSurvey)
- Should be used to reduce the workload in the follow-up and directly linked to the registration process for data protection reasons

Advice for developing the questionnaire:

- By asking for sociodemographic information and existing affinities to topics and formats of the event, the group of participants can be described in detail in the follow-up
- Questions and statements about the evaluation should be concise, clearly formulated and, if possible, tailored to one aspect
- Since respondents tend to give ratings in the middle, especially for long series of answers, options in scales or answering formats that reinforce this should be avoided
- Particularly when negative ratings are given for standardized questions/statements, appropriately filtered open questions should be asked as to the reasons behind such ratings

Guided interviews in the follow-up to the event

- Suitable for in-depth questioning
- Make motives and attitudes visible on an individual level and provide an explanatory background for quantitative data
- Have an open communication style
- Deliver new information and perspectives beyond the predefined questions and topics
- Open-ended questions formulated to provide inspiration in the interviewer's own words make the interview feel like a conversation
- The discussion should cover the interests of the interview subject and the predefined topics in equal measure

Sample agenda

SCHEDULE FROM THE EVENT IN STUTTGART

Friday, November 29

from 3:00 p.m. **Registration and welcome coffee**

4:00 p.m. **Greeting and introduction**

4:30 p.m. **Getting to know the participants in small groups**

5:00 p.m. **Thematic workshops**
Scientists present their research fields. Discussion with all participants. Citizens ask questions and provide insights from their everyday lives.

Workshop A):
"How does our demand for milk, meat and eggs impact modern farm animals?"

Workshop B):
"The greenhouse gas balance of agriculture – does being a vegetarian protect the climate?"

Workshop C):
"Lobbying in democracy – a curse or a blessing?"

Workshop D):
"Plastic and the environment – What can we do given that plastics are indispensable?"

Workshop E):
"Stuttgart can do everything, so why not cycling?"

Workshop F):
"Does anyone still need media?"

6:45 p.m. **Reports from the workshops in the plenary**

7:15 p.m. **Group dinner and event closing**

around 10:00 p.m. **End**

Saturday, November 30

from 8:30 a.m. **Arrival and registration**

9:00 a.m. **Greeting and review of day one**

10:00 a.m. **A scientist tells the inside story**
Coffee break. Citizens ask – scientists talk about their day-to-day work

10:30 a.m.

Behind the scenes of science
Group work based on questions such as: How do the tools of science work? How independent is science, who finances it, and what role does it play for democracy and the common good?

11:45 a.m. **Reports from the working groups in the plenary**

12:15 p.m. **Closing sessions in the small groups of the previous day and outlook**

1:00 p.m. **Lunch together**

around 2:00 p.m. **End**

Information and links

OPPORTUNITIES TO LEARN ABOUT RESEARCH AND SCIENCE COMMUNICATION IN GERMANY

General studies, lecture series and auditing opportunities

Most universities in Germany offer general courses that are open to the public and which all citizens can attend.

Lists of experts at universities

Some universities offer citizens the opportunity to contact scientists at the institution directly and speak with them about current social issues.

University libraries

Non-students can use the services of the university libraries at most universities. You can read and borrow books there for free or for a small fee. Some libraries also offer courses, for example, on how to the use the university library.

A selection of the best science websites on the Internet

www.wissenschaft-kontrovers.de

In the discussion series "Controversial Science," citizens hold discussions with scientists in different formats and give their feedback directly to research.

www.spektrum.de und www.scilogs.de

The website of the popular scientific magazine Spektrum provides numerous articles and links to topics such as astronomy, environment and medicine. What makes it special: the articles on the website and in the booklet are often written by scientists and are easy to understand. Some articles are also written by science journalists. On the blog portal scilogs, hundreds of dedicated scientists and science journalists write about and discuss the environment, technology, and politics.

www.riffreporter.de

This recently launched website collects articles from 80 outstanding science and nature journalists with expertise on a wide range of scientific and nature-related topics. For example, there are topics on birds, health and medicine, energy (transition), and astrophysics. Just browse through it! You can also subscribe to specific topics. What's more, if you send an email to RiffReporter, they always answer.

www.klimafakten.de/en

What do we know about climate change and what don't we know? How do scientists make forecasts about the future of the climate? The website is a very factual collection of the most important up-to-date and reliable information in an understandable form. It gives you facts that help you participate in the discussion. For even more climate science, go to www.deutsches-klima-konsortium.de

www.hochschulwatch.de

Most state funding for science in Germany goes to universities and major scientific institutions such as the Max Planck Society, the Helmholtz Association or the Leibniz Association. The scientists can largely decide for themselves how to allocate the funding. The participants of "Science, Man!" were interested in whether industry or certain interest groups give money in order to influence science, and how much. This is what the Hochschulwatch project is trying to find out, at least for colleges and universities in Germany.

www.wissenschaft-im-dialog.de/en/about-us/

If you are interested in the dialogue between science and society and events similar to "Science, Man!," we recommend that you simply browse the website "Wissenschaft im Dialog." You will find a lot of information and links to other projects. You can also contact the people there and ask questions about scientific topics.

Science on YouTube

There are now many science-related channels on YouTube. Just take a look, but keep in mind that there is usually no fact checking or editorial review like in journalism! There is one YouTuber we would recommend who knows what she's talking about, because she is herself a PhD scientist (chemist): Mai Thi Nguyen-Kim. Her channel is called maiLab. She has received several awards for her work. Other exciting channels include:

- MrWissen2go
- Dr. Watson
- Kurzgesagt – In a Nutshell
- Veritasium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forschung / gemeinn.
Erkenntnisgewinn

Appendix

At the interface between science and society

PROJECTS OF THE ROBERT BOSCH STIFTUNG

University Communication Prize

In cooperation with the German Rectors' Conference and ZEIT-Verlag, the Robert Bosch Stiftung awards prizes to future-oriented strategies and instruments for the communication work of universities. The award, worth 25,000 euros, is presented every two years as part of the annual meeting of the German university rectors. Some of the categories for the tender included: "Best university magazine (2005), "Best website" (2007), "Best student marketing" (2009), "The liberal university" (2011), "Best communication performance of a university in social media" (2013), "Our university – our city" (2015), "Knowledge for society: Communicating the latest university research" (2017).

Falling Walls Engage

Falling Walls Engage is an international platform for breakthroughs in science communication and science engagement. The aim of the program is to spread science literacy and science education, especially to non-scientific target groups. It promotes co-learning, the exchange of ideas, and further education between practitioners in the field of science engagement as well as supporting the importance of science and enthusiasm for science in society. Its aim is to increase the understanding and appreciation of science and improve the perception of science engagement in the public and the research landscape by presenting examples of successful science engagement from all over the world. Every year, one of 20 outstanding science engagement projects is chosen as the Falling Walls Science Engagement of the Year."

SILBERSALZ Science & Media Festival

The SILBERSALZ Science & Media Festival is an international festival for science and media. SILBERSALZ is a versatile platform for scientists, media professionals and experts, and is also a special place for science communication for the general public.
Its overall aim is to bring together scientists, media professionals and civil society to discuss issues relevant to society. In doing so, it uses various information and communication tools: Films followed by discussion rounds, interactive exhibitions, talk rounds, multimedia workshops, and creative events. In addition to its publicly available resources, it hosts a specialist conference that provides an interdisciplinary space for science and the media to develop innovative ways to communicate knowledge and obtain opportunities for production related to specific topics.

»Berlin School for Public Engagement and Open Science«

The Berlin School of Public Engagement and Open Science is a joint project of the Berlin Natural History Museum, the Humboldt University of Berlin and the Robert Bosch Stiftung. Embedded in the Science Campus for Nature and Society, which the Natural History Museum and the Humboldt University will be developing in the coming years, a center is being established together with the School of Public Engagement and Open Science, where science interacts with society and science benefits from its involvement with society. The aim is to create a publicly visible place where new practices are tested and passed on that involve the exchange of ideas between science, society, and politics. Open science will become part of the training and further education of scientists and students at Berlin's most important science institutes.

Science Barometer

Wissenschaft im Dialog's Science Barometer has been asking citizens in Germany about their opinions and attitudes toward science and research every year since 2014. How interested are people in scientific topics and how do they find out about them? How much confidence do people have in science? How does the general public rate the transparency and benefits of scientific work? How common are skeptical attitudes toward science? The Science Barometer is a trend and topic scout for actors from scientific organizations, universities, science communication and politics, which they can use for their work. With the support of the Robert Bosch Stiftung since 2017, the questionnaire has been revised and expanded so that the data can be scientifically evaluated and applied.

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