Deliverable 4.2

Synthesis of the National Reports results of the different Rethinkerspaces: lessons learnt

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Executive Summary

This deliverable is designed to reflect upon the work carried out in the context of the Rethinkerspaces workshops. First, it describes the aims of the Rethinkerspaces as local hubs in the seven countries across Europe, the main features of the Rethinkerspaces and the methodology used. Second, an overview of activities is provided. Third, the main outcomes and points discussed per workshop and per Rethinkerspace country are described. Lastly, we provide a conclusion and the implications of the main lessons we take from our experiences with the Rethinkerspaces.

1. Introduction

Science communication is at a pivotal stage in its evolution. The emergence of digital communication platforms not only present new opportunities but also lead to new challenges. This has changed the science communication landscape and RETHINK's aim is to provide a novel view of it. Rethink reveals the barriers and inequalities that stand in the way of open and reflexive connections between science and society. It also presents the way forward, encouraging evidence-based transformations in science communication practices.

To this end, over past three last years, the RETHINK project has mapped current science communication activities across Europe, including those taking place in the currently uncharted digital sphere. It described the widely diverse roles and repertoires of science communicators to navigate the complexities of the current science communication landscape, that is characterised by fragmentation, digitalisation and the rise of social media platforms, commercialisation and increased sensational value of scientific news, and challenges related to post-normal science. It has explored the 'sensemaking' practices of citizens during the Covid-19 pandemic across Europe. The results of this study proved to be a sobering insight for science communicators, for citizens only rarely refer to science communication output and primarily make sense of science on basis of their personal situation and social context. Therefore, the RETHINK project developed reflective practices together with science communication practitioners, as a way for science communicators to transform their practice and stay relevant to the sensemaking practices of citizens. Lastly, RETHINK provided a picture of current science communication training; revealing gaps in its scope given today's challenges and priorities in the science communication ecosystem and developed training resources.

The RETHINK project has researched these themes together with the so-called Rethinkerspaces, or local hubs with frontrunners from the theory and practice of the science communication field, and were established in

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seven European countries: Italy, Poland, Portugal, the Netherlands, Serbia, Sweden and the United Kingdom (UK). The Rethinkerspaces acted as testbeds and validation mechanisms for the research results of the project. Vice versa, each Rethinkerspace meeting gave input for new studies conducted within the project. With this, a synergy between science communication theory and practice was strived after. The Rethinkerspace concept is based on the principle of the "Community of Practice" and can be described by the following features: multi-stakeholder, transdisciplinary and with a transformative capacity (see D4.1).

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2. What are Rethinkerspaces: aims, features and methodologies

According to the philosophy of the RETHINK project a wide arrange of actors need to work together to find meaningful answers to the question on how to improve science communication nowadays. Moreover, the involvement of practitioners ensures that their legitimate interests, motivations, and commercial realities are considered. Accordingly, RETHINK established seven hubs, called Rethinkerspaces, which generated a thorough and widespread overview of the national science communication landscape and act as testbeds and validation mechanisms. The Rethinkerspaces had the following features:

2.1 Characteristics of the Rethinkerspaces

a) Employing a transdisciplinary approach: A transdisciplinary approach not only transcends single or individual disciplines, but also the boundaries of the scientific community, to an approach that includes the incorporation of the views of multiple scientific and non-scientific actors, professionals and amateurs. These individual actors came from a range of perspectives and backgrounds, for example scientists, science journalists, bloggers, influencers, DIY-ers, artists, public engagement professionals, policymakers at local and national level, science funders. They all brought their own knowledge and expertise to the Rethinkerspaces, of which the other members learnt and subsequently integrated this 'new' knowledge into their own field of expertise.

b) Becoming a community of practice: The concept of the Rethinkerspaces was based on the Community of Practice (CoP) approach to social learning. When multiple stakeholders share a passion, interest or a sense of urgency to progress together – often with respect to a specific topic – and form a community around a shared domain of interest this is called a Community of Practice (CoP). Through mutual engagement and by working on challenges in their shared domain of interest, members of a CoP generated innovative and creative solutions, and new practices.

c) Aspiring to transformative learning: Research on socio-technological change has shown that system transformation will only happen if multiple initiatives challenge the "status quo" at all three levels. In this project we approached it as a transformative learning process. Hence the aim for RETHINK was to co-develop a network of science communicators (and other relevant actors in the science-society landscape) that has transformative capacities in realizing a future proof science communication landscape across Europe. Practically this meant that the coordinators and members

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of the Rethinkerspaces themselves became ambassadors of transformation, and through the trainings and tools provided to the Rethinkerspaces during the life cycle of RETHINK, the coordinators became equipped to facilitate the emergence of new transformative network in their own science communication environment.

2.2 Locations and phases

The Rethinkerspaces were established in universities and science engagement organizations from seven European countries that together represented a wide range of the European science communication landscape: Italy (SML), the Netherlands (VU), Poland (CSC), Serbia (CPN), Sweden (V&A), and the UK (UWE). Each of the Rethinkerspaces identified a group of relevant individuals that formed the core of the Rethinkerspace. Via their local communities, Rethinkerspace hubs were in charge of creating communities of inquiry to acquire insights into the emerging science communication landscape, map networks, actors, roles and repertoires, contribute to understand sensemaking practices and test a new quality of interactions framework.

The RETHINK research approach constituted a transdisciplinary, participatory, and action-oriented perspective. The Rethinkerspaces took part in the research activities carried out in WP 1, 2 and 3 by collecting data, which were then analysed by the project partners. The results were fed back to the Rethinkerspaces for reflection and dialogue. The project was structured according to a basic model of reflective inquiry, consisting of three subsequent phases, that in itself contributed to building a community of inquiry and practice:

3. **Understanding the science communication landscape**
4. **Developing and experimenting with new roles and strategies**
5. **Synthesizing into recommendations and guidelines for scientists, practitioners and policymakers**

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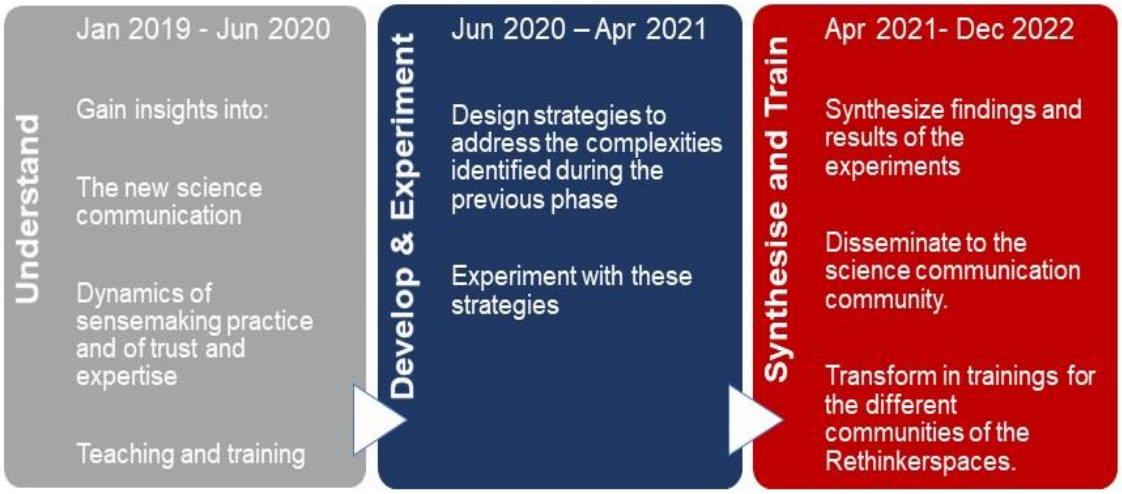

For the Understand phase, the role of the Rethinkerspaces was to bring their local perspective and input. Activities focused on gaining insights into the new science communication landscape. This included investigating the actors of the current and emerging landscapes, their roles, relations and repertoires. The research also investigated the dynamics of sensemaking practice and of trust and expertise. Finally teaching and training were also examined.

For the Develop and Experiment phase, the Rethinkerspaces aimed at designing strategies to address the complexities identified during the previous phase. In addition, they were also in charge of running a small set of experiments and testing new ways of doing science communication adapting them to the local perspective and proving their validity.

For the final phase, Synthesize and Train, Rethinkerspaces trained their local stakeholder community to implement the new methodologies and strategies developed in the previous phase in order to establish improved interactions between science and society. These methodologies and strategies have been developed and tested in a shared learning process by the Rethinkerspaces in previous phases.

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3. Rethinkerspaces' activities

3.1 Steps and Tools

We have structured RETHINK around three research work packages and a timeline divided in three phases. For clarity, the strategy for establishing and running a Rethinkerspace has been broken down into 6 steps that fit into the different phases. Each step is linked to the different work packages and research phases and built around a series of workshops and some research activities.

a) **Step 1: Establish the Rethinkerspaces as part of the institution**
b) **Step 2: Rethinkerspace stakeholder map**
c) **Step 3: Build the Rethinkerspace**
d) **Step 4: Understand the landscape**
e) **Step 5: Experiment with new approaches**
f) **Step 6: Train for transformation**

The following diagram explains how the different work packages, phases and steps were linked:

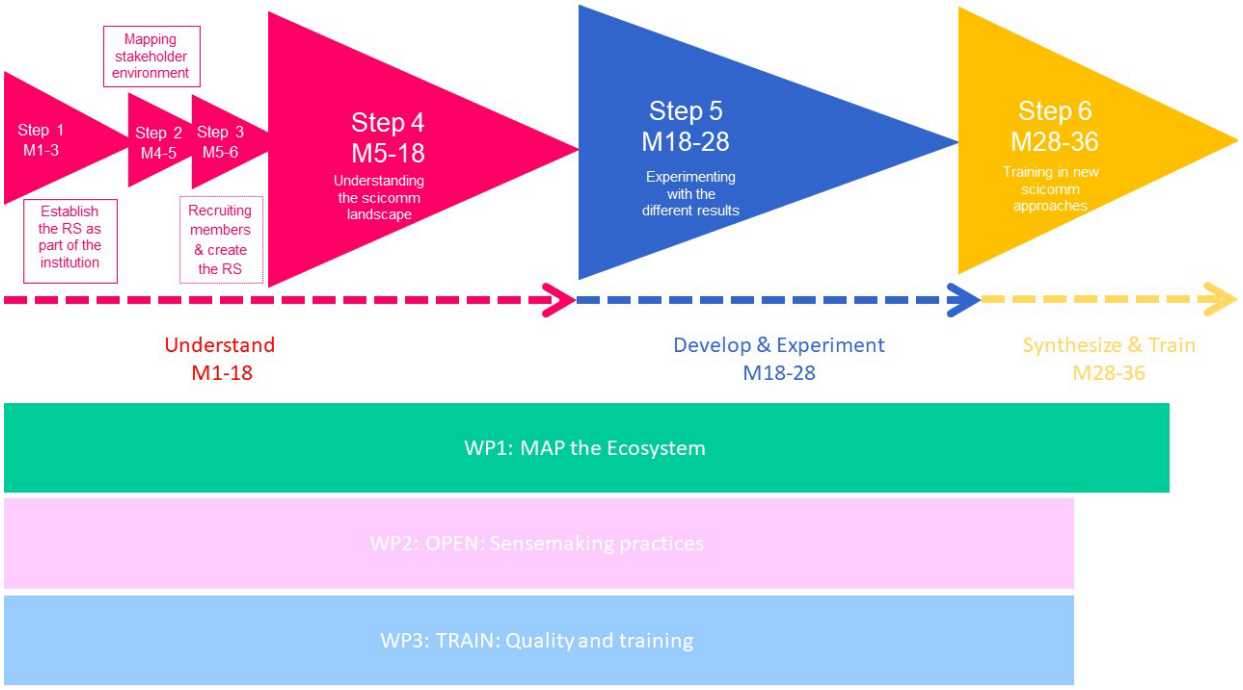

Figure 1: Steps of the process

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3.2 The list of Rethinkerspace Workshops that took place during the project:

Workshop no.	Focus area	Goals	Time
WS 1	Forming communities of practice and inquiry	• Rethinkerspace kick-off • Getting to know each other • Reflect on the scicomm landscape: who are present in the current digital scicomm landscape, what audiences do they reach, what challenges do they encounter? • Create the shared RETHINK story	January 2020
WS 2	Sensemaking and quality in science communication	• Development of the role typology of the new science communication • Reflecting on and collection of (best) sensemaking practices	November 2020
WS 3	Reflective practice	• Presentation of and experimenting with possible strategies of opening up science to society and science communication practices	May & June 2021
WS 4	Strengthening networks and connections	• Presentation of the results of the project • Train the Rethinkerspace participants in new ways of doing science communication.	November & December 2021
WS5	Rethinkerspace sustainability	• Had Rethinkerspace participants from all hubs meet and exchange experiences • Had all Rethinkerspace hubs, its hosts and participants work on aspects of sustainability the network and approach, as well as growth in contexts beyond the 7 countries.	March 2022

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3.3 Participants

There were approximately 90 participants in the 5 Rethinkerspace Workshops in the 7 countries addressed (Netherlands, UK, Italy, Portugal, Serbia, Poland, Sweden). The participants included stakeholders from various sectors including science communicators, journalists, researchers, academics, bloggers, lecturers, teachers.

Below is a presentation in terms of stakeholder type, as it was defined in deliverable D4.1. Apart from this sub-categorisation, the areas of work of the stakeholders have been rather diverse: it included the fields of climate change, media, physics, artificial intelligence, energy sector, health sector, neuroscience, oceanography, environmental science, resources management,

	Scientist	Practitioner	Citizen	Enabler
Poland	**4**	**5**	**1**	**1**
Portugal	**11**	**4**	**1**	**1**
Sweden	**4**	**4**	**2**	**1**
Netherlands	**1**	**11**	**3**	**1**
UK	**3**	**4**	**2**	**4**
Italy	**5**	**4**	**2**	**1**
Serbia	**1**	**10**		

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4. A synthesis of the 7 country reports with an emphasis on outcomes

4.1 Objectives of Workshop 1

The objectives of workshop 1 have been:

- **Rethinkerspace kick-off:** This was the first Rethinkerspace workshop. As such, it was the official launch of a community of inquiry in your local countries.
- **Getting to know each other:** An important goal was therefore to get to know all participants. More, it was important to create a community that is strong and motivated to continue working together for as long as possible.
- **Reflect on science communication ecosystem:** This part of the workshop is dedicated to work package 1: mapping the digital science communication landscape. Exercises focused on: Who are present in the current digital scicomm landscape, what audiences do they reach and what challenges do they encounter?
- **Create the shared RETHINK story:** This part of the workshop is dedicated to the trends that lay to the heart of the RETHINK project: digitalisation and fragmentation of science communication interfaces, and the blurring boundaries between science and society. Exercises in this part of the workshop focused on letting the participants themselves explore and think about these two trends. Participants made a 'problem tree' of challenges they encountered that specifically related to the two trends, and did an exercise about how they feel we could overcome these challenges.

4.1.1 observations and lessons learnt from all 7 countries

In the following tables we have attempted to summarise the main points the first Workshops in the 7 Rethinkerspace hubs

Rethinkerspace	Main Outcomes
	Motivations to communicate science The workshop focused on informing and encouraging evidence-based attitudes and behaviour to address the matter of people having their

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Portugal	biases confirmed by their social connections. Science communicators should play an important social role and allow people to make well informed decisions and try to reach people and get them out their echo-chambers. In this endeavour countering fake science and fake news is also task. In addition, the organisers focused on: • Inspiring people to pursue a career in science. • Creating conversations between researchers and the public - and improving scientists communication skills. • Promoting public debate on science issues and influencing political power by getting citizens involved in the decisions processes and by increase public participation and citizen science. • Breaking down barriers between scientists and journalists • Reinforcing and sharing an institutional image and strategy. **Audiences and Connections** In relation to audiences the importance of tackling the barriers of reaching **policy makers**. Those are considered to be a very hard to reach public, due to lack of interest, lack of strategies and appropriate forums to meet and discuss as many decisions are not always based on the best scientific knowledge but particular interests. In addition, **younger audiences** are seen as hard to reach as well. The participants identified some main reason for it: lack of interest and

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	participation outside school (*«any science-related issue is seen by youngsters as school stuff»*), there is an *educational* approach in most of the scicomm projects that target young people. There is also a lack of representation of young people in media and science. **Minorities and underserved communities** are very challenging audiences too. These groups are hard to identify and hard to reach through civil organizations. There is a lack of local investment, very few local niche facilitators and low levels of representation in society A major obvious challenge has been identified in trying to reach **science deniers and overconfident actors s**uch as journalists. «People get their biases confirmed by their social connections» and their attitudes towards scientific issues are occasionally despiteful. **Barriers and Challenges** Overall, the bigger barriers for science communication identified and discussed were the **lack of interest** and motivation of the audiences and the **lack of institutional strategies** and scientist's **communication skills**. All those barriers converge to the low quality and efficiency of scicomm products and increase the gap between science and society. Often such products bring in little or no revenue to those creating them. Communicational literacy is seen as a major cause of ineffective scicomm products. *«The right tone is hard to find»*. To be a clear and authorized voice of science should be a main goal of science communicators and institutions. *«Sometimes institutions are not clear about the goals of their communication»*, and they have a very low budget for communication

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	purposes and scicomm professionals don't get the social and financial recognition they should get. It has been reported widely that «when people don't understand the language, they feel threatened». As for science communicators it seems that «sometimes people doing scicomm are perceived as arrogant» **Digitalization and science opening-up** Digitalization amplifies both good and bad science. It creates new needs for strategies and resources needed to reach new and more diverse audiences. And despite the noise, It gives the opportunity to listen more carefully and get to know the audience better.

Rethinkerspace	Main Outcomes
Italy	The participants were split in three groups. One of the most interesting outcomes was the fact that all three groups, despite working separately, have focused on the same challenge, that of difficulty in understanding between science and society. The challenge was indeed tackled in slightly different ways. One group focused on the use of language; the second group focused on more conceptual lack of understanding; and the third one on the role of efficient communication. A particular activity demonstrated a very strong difference in motivations between practitioners (such as journalists and writers) and scientists (even in the case of scientists who are involved in informal education, science

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	communication and citizen science activities). There was quite some debate between journalists, focusing on for example the importance of reaching out to hard to reach audiences and scientists, science publishers and press officers, focusing more on fighting misinformation (inform, educate, create relationships between scientists and public).

Figure 2: Italian Rethinkerspace hub

Rethinkerspace	Main Outcomes
	An important feature of this first workshop has been the willingness of the participants to form a small community of practice and work together as a team.

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Sweden	The participants agreed on particular on motives, as well as barriers in conducting effective science communication. The following motives have been discussed: • Countering misinformation • Promoting evidence-based attitudes And these were the barriers: • Lack of time • Lack of funding • Lack of recognition from management This aggreeemnt among participants reinforced a sense of community in knowing that others are also fighting the same problems! On the other hand, there deviations, regarding who has the main responsibility to communicate science effectively. These were their ideas: • Communication officers • Researchers, the funders • The government Two subjects that were discussed extensively, and that are not common in the Swedish scicomm debate in general, were: • The importance of actively engage many different demographics groups i.e. that everyone must feel included in science • The need for active lobbying for science, just as other sectors are actively lobbying for their causes.

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Rethinkerspace	Main Outcomes
UK	**Motivations to communicate science of the Rethinkerspace participants** • Informing, educating, entertaining: encourage evidence-based behaviour, provide important and correct information so that audiences can take an informed decision (e.g. vaccines); entertain because if the content or topic is boring, the audiences will not read it or will lose attention. • Science as a hobby: encourage people to like science for what it is. • Inspire people to undertake a science career, getting more people in the industry (e.g. engineering). • Increase trust and interest in science. • Societal and ethical considerations, implications on research: involve society in the research process to improve research itself by consideration of ethical issues and the impact of the research on society. • Find relevancies and purposes: find what is relevant for the audience, researchers, organisations. • Create connections between different actors (researchers, audiences, organisations, partners, representatives of target communities). • Reach underserved audiences, reach echo-chambers. • Share my work with an audience. **<u>Audiences and connections:</u>** Know your audience: • Involve partners, community representatives, influencers, charities in the project/campaign to understand and reach your audiences

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	• Broad audience vs. niches: some participants target broader audiences, others aim at small or specific communities. There was an aspiration to improve younger scientists' media representation (instead of interviewing only senior researchers and principal investigators). Become a trusted voice, use the reputation of the institution or individual. Consult with the public: • The audience should be able to have an opinion. • There may be a power imbalance between experts and community - it is important to build trust between the two parties to avoid it. • Longevity, sustainability and scalability of a science communication project should be set with the community. This may mean there is a requirement for a long-term engagement with the community and setting expectations with them. Adopting a non-neutral stance – the audience often request organisations to share their opinion on certain science topics. **Opportunities of digitalisation** Digitalisation offers opportunities especially for citizen science projects – bigger and more meaningful projects. Digital media are fast, low cost and easy to use; they can allow greater reach, the gathering of anecdotal evidence and two-way communication and engagement (though the use of jargon can limit it). Digitalisation enables the democratization of knowledge and expertise, sharing of knowledge (i.e. pulling in societal expertise).

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	From the cathedral to the bazaar: digitalisation allows many-to-many dynamic communication rather than one-to-many top-down communication. **Barriers to science communication** Watch your enthusiasm, it can make you lose focus on your message. Language: be careful about scientific jargon. Quality vs. quantity: which one should we prioritise in online communication? From the cathedral to the bazaar: • Online users can pick messages/content and share them out of their context (pick pockets) • Fake goods: how do people know who to trust? • Cacophony of noises: an overload of information and sources of information online (means people turn off) Trolls and anti-science actors can hijack the comment sections of online communication. They are the most vocal and provide feedback, but they may be difficult to deal with. Reaching audiences: • How do we know we are reaching the audience? There are difficulties evaluating reach of online science communication. • How do we know audiences care? Audiences may not relate to the message. • How do we know audiences are (still) listening? • Visualisation, complexity, misconceptions, and politicization of broad audiences.

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	• Confirmation bias and cognitive dissonance: how do we get through echo-chambers, misinformed, polarised and/or hostile audiences? • Catching and maintaining the attention of audience when there is much competition of content online. • Bias in social media: perception that only young adults use social media, but older people may use it too; moreover, there may be differences in digital literacy and accessibility depending on age, background, geography. Power imbalance: • Journalists vs communicators –science communicators are taking over science journalists' tasks (there is a PR influence on journalism). • Conflict/tension with management, funders, the marketing offices of institutions: 1. Different priorities - limited budget for certain projects/campaigns. 2. They may not know the audience and what they want. 3. They may underestimate the digital skills and communication strategies required to reach the audience. 4. They may limit the communication strategies, creativity of communication. 5. Low pay of practitioners. Digital skills: • Digital tools feel intuitive and encourage blurting out, they give a false sense of security. • Lack of skills needed to use digital tools amongst scientists: What skills are needed to use digital platforms effectively? Who provides those skills? What training is needed? • Lack of confidence in using digital tools:

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	1. Feeling that we do not use digital platforms to their full potential. 2. Need to empower researchers with digital skills, but what skills do they need to engage online? Measuring evaluation and engagement: how do we measure output and outcome online? What does 'engagement' mean online? Conveying the complexity of science on digital platforms that are more and more entertainment-based (e.g. TikTok) **Solutions** Post unique and post high-quality content regularly. Become an authority in a small space or spaces. Change the package of the content: • Collaborate with influencers to package the content differently. Influencers (e.g. YouTubers, Instagrammers) have more freedom in generating content and they do it for fun; they can be very creative. Organisations often limit the creativity of communication and focus on what works for sure (limiting the risks of failure). • "Don't call it science, call it cool stuff". 'Science' can put off audiences even if they are curious. Packaging content differently can help attract audiences. • Participants mention the communication/packaging of science as a hobby in their motivations (see above), but they also stated that not everyone needs to be interested in science. Use web and social media analytics to evaluate what communication strategies/activities work and what don't.

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	SEO: adapt your communication strategies to the APIs updates of the digital platforms. Digital platforms change their APIs regularly, hence the visibility of the content can be affected. Make your team diverse. About audiences: • Be clear about who you want to reach. • Balance funders' demands with what works. Funders may demand to reach a broad audience but a smaller one may be better (better engagement). • Build relationships with one audience - focus your communication and engagement on one clear audience rather than scatter them across several audiences. • Ask for help to reach your audience – collaborate with influencers, charities, audience representatives -partnerships are important. • Reach specific communities or groups interested in a topic (e.g. subReddits, Facebook groups). • Beta-test your campaign on diverse groups. Science communication is often done in the spare time, as a hobby. It needs recognition. To overcome lack of time: • Improve management – set clear goals, prioritise and delegate (issue about delegating - the staff available may be not trained or they may not understand the value of communicating science). • Charge for your time - your time has value. • Learn to let go tasks (prioritise).

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Rethinkerspace	Main Outcomes
Serbia	In this first workshop participants engaged extensively with the activities and were responsive to the discussions. Their reflective approach offered meaningful criticism to the local scicomm ecosystem. In addition, they did not offer an optimistic view on the matter. It has to be mentioned we were offered personal views, without taking into account the wider picture. This raises the question on the participants' experience with a possible lack of full knowledge of the structure of the local scicomm ecosystem. It seemed also seemed from time to time that participants did not listen carefully the instructions and spontaneously engage in discussion. Finally, overall it was a very inspired experience for everyone invovled. Rethinkers were willing to continue their contribution to the Rethinkerspace and attend the following workshops.

Rethinkerspace	Main Outcomes
	Barriers and Motivations • Making people enthusiastic about science, but even more so to contribute to an evidence-based attitude of citizens: “help people shape their own opinion”.

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The Netherlands	• The divide between the elite and 'the people' is viewed as a major challenge: "people with a lower level of education are the most underserved community (in Scicomm, red.)". **Digitalisation** Trends of digitization and blurring lines between science and society are widely recognized and are viewed to have major implications for Scicomm practitioners. Participants believe they have an important role to play in the light hereof. At the same time, due to the ease to publish contents, science journalists seem valued less (as budget cuts indicate). Furthermore, digitization leads to more speediness in a lot of aspects of life, while nobody is happy about this, "which is why we end up watching cat videos". **Challenges** Against this backdrop, the following major challenges were identified and discussed: • Disinterestedness: "this does not relate to me?". Scicomm – and making good use of digital methods – can play an important role in overcoming disinterestedness, for instance, by helping scientists to communicate in a better way • Fragmented Media Landscape: according to participants there is a disconnected between who your target audience is, and what kind of media are employed. "Science is always lagging behind in terms of form". At the same time, participants find it crucial that there is a balance between adapting to your target audience on the one hand, and staying authentic (as scientist or science communicator) on the other hand. The participants wonder how the fragmented media landscape could be used in an optimal way in Scicomm

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	• Insufficient funds for Scicomm: prohibit learning and capacity building. In light of the previous issue, this sparked the idea that perhaps more thought should be given to who is doing what. With better organization of the landscape, perhaps underserved audiences could be better served • Balancing between fact and emotion: scientists need to realize that facts are not enough for effective communication, but on the other hand, focusing on emotions along, will also not suffice. Patient information has come a long way in this regard and might serve as inspiration.

Rethinkerspace	Main Outcomes
Poland	Due to the nature of the first Rethink workshops, they have passed in an atmosphere that can be described as quasi therapeutic. We largely touched the landscape of the science communication environment and the problems that appear in this field. In addition to the topics that could be expected, i.e. the lack of funds allocated for science communication, an extensive exchange of opinions was devoted to hate on the Internet and ways to defend against it. This subject also touches on a broader topic related to information noise and the lack of reliable sources of knowledge. The discussion turned towards cognitive errors, heuristics, browser algorithms, social psychology and other elements in which interaction generates problems that we know.

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	Perhaps because of the association with the place where the workshop took place or the fact that participants are related to education, the discussion weighed towards improving the quality of education from an early age. In Poland, this subject is particularly important, especially after the recent education reform. We have a strong focus on how to reach people who are not convinced or have a different opinion – we agreed, that the most important factor is to look for common ground/common features that will allow unconsciously qualifying to one group and not dividing into "us" vs."they". The declared values were visible in the worksheets filled out by participants - one of the main values and goals they pursue was to encourage evidence-based attitudes and behaviours, and counter misinformation. Often manifested as the main motivation associated with the start of science popularization was anger associated with misinformation spreading by politicians, for example about climate change. Besides, a willingness to educate and inspire young people to broaden their interest in science was also a very important factor

4.2 Workshop 2 Sensemaking and Quality of science communication

This was two-part workshop. In the first part participants worked with the concept of Sensemaking.

Science communication allows us to make sense of science and the relationship between science, society and the social issues we are confronted with. Sensemaking is the fundamental way by which we develop an understanding of this complex reality. It involves continuous interpretation by means of telling stories about the world around us. Making sense of the complex reality of science and science-society issues is not an easy task; particularly given the

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large volumes of information presented digitally online. One of the major aspirations of RETHINK has been to explore the sensemaking practices of citizens as they seek to understand scientific developments and scientifically important challenges.

In order to understand sensemaking practices, Rethinkerspace organisers interviewed a number of people (outside the group of participants) to understand how they make sense of the emerging Corona crisis.

The objective of this workshop was to present the results hereof and, together with your Rethinkerspace members, explore the meaning of your sensemaking research for the broader field of SciComm – both in general and in your local context.

In the second part of this workshop 2, we addressed the role of Quality in science communication. The concept of quality is difficult to grasp as the perspectives of communicators and audiences' expectations can vary largely. Moreover, previous research has hardly dealt with communication quality and the context of (digital) science communication. In this workshop, we focused on the perspectives of the Rethinkerspace members to reflect upon science communication quality.

Questions in focus were: how can we approach science communication quality in a digital environment? Is it necessary and possible to develop certain standards for science communication quality and its assessment? And if so, where should these standards derive from and how could they be established, institutionalized and secured given the complexity of the digital science communication environment?

To answer these questions, we combined the presentation of results of our research (see Deliverable 3.2 Report on experts' views on current science communication quality and demands) with discursive elements to gain the broadest possible perspective on issues of quality in the new science communication landscape.

Therefore, Rethinkerspace participants were invited to:

- **Reflect about the concept of quality in science communication in a digital media environment**
- **Acknowledge the differences of quality requirements in different science communication contexts**
- **Discuss and evaluate approaches to ensure science communication quality**

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- **Focus on the role of training and science communication education to promote science communication quality**

4.2.1 Observations and outcomes from WS2

In the following tables we have attempted to summarise the main points from second Workshops in the 7 Rethinkerspace hubs, offering insights on both Sensemaking and Quality.

Rethinkerspace	Main Outcomes
Portugal	**WORKSHOP 2A: Sensemaking** In this second workshop, Sensemaking was understood as are rather crucial tool in reaching out to people's emotions and to address to issues of anxiety and possible anger when "science does not have the answers" **General discussion and conclusions:** A number of points have established in this workshop: • Scicommers need to communicate uncertainty and the scientific method • Science is to be told not just as a body of knowledge, but as well as a process continuously growing, trying to fill the gaps of knowledge and always questioning itself, absorbing new information and realities.

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	• Science must be shown as mutable: just like humans mutate and evolve, science does it so - this can be useful to increase confidence in the relationship citizen-science. • Too much information (reported in mass media) can be damaging and confusing. • Scientists (and therefore scicommers) play an essential role in the media. • People do seek official info and it needs to be clear and effective. • Explain the reasons behind recommendations, explain how science works - these two combined are needed in order to people interpret data and follow the adequate behaviours. **WORKSHOP 2B: Assessing science communication quality** Here are the main points in the workshop on the quality of science communication: • Target is essential in order to define quality - specialists vs non-specialists • Concrete and measurable goals are important • Scicomm must be inspiring and it needs make good use of design and visuals • It has to be accurate and rigorous and be able to measure these online. • It has to contribute to the fight of misinformation with particular attention to sources of info that must be clear and reliable.

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	Two major criteria categories are language and credibility: • Language must be clear and effective. Always support the narrative with facts. • Credibility clearly identify the author, the sources and the areas or level of expertise. There also certain groups of criteria that were seen as more relevant: **Presentation criteria**: • Use of congruent visual elements • Link to specific authors • Demonstated reachable contacts **Content criteria:** • Useful content to targeted audience • Relattion of content to the lives of people • Clear language and original content • Representativeness must be adressed **Interaction criteria:** Use of powerful interaction tools provided by the online resources to keep horizontal interaction with the general audiences (Q&A, debates, comments) and peer interaction. **Most feasible and effective strategies to promote Science Communication Quality** Several approaches to raise overall scicomm quality were discussed. These

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	were the highlighted picks: • Some kind of fact-checking seal of approval, in partnership with major social media platforms to quickly identify problematic content, is needed • Starting with the audience to improve media literacy must be prioritized. Quality criteria for digital communication cannot be a top-down approach. • Invest in education, raise awareness for the importance of science communications amongst young students (whether they will be scientists or not), better education and critical view of society. • Awards that name role models and provide incentives to better science communication.

Rethinkerspace	Main Outcomes
	WORKSHOP 2A: Sensemaking This workshop focused on how our sensemaking approach can enhance science communication in the digital environment. Reflecting upon their own work, the participants agreed with particular aspects of the sensemaking methodology: Putting an emphasis on the role of emotions, motivations and experiences of the recipient, allows scicomm practitioners to better adjust the message to the audience.

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Poland	Participants expressed doubts about the approach taken through interviews in relation of finding useful insights. The participants expressed a strong interest in studying material that focus on good communication practices, which could be created on the basis of looking into the work conducted on how to convince someone to accept the scientific consensus. Most of the participants declared that they use elements of the sensemaking method already. **WORKSHOP 2B: Assessing science communication quality** The conclusions generally agreed with the conclusions of the Delphi Study (See D3.2). However, it is visible how the local approach to the topic at Polish universities influences the ideas presented by participants, who emphasize the need of the science communication professionalisation (in Poland, sci-comm is more like a hobby, not a 'real job'). They also pointed out that universities and scientists have a disrespectful approach to scientific communication, which translates into a lack of motivation to undertake such activities. An important element is also the need of the system changes that will allow recipients to better understand, for example, how science works and what the scientific method is, how to use information sources and think critically. Despite agreement on many aspects, there were doubts on two cases: Is it worth using clickbait titles? Is it worth presenting arguments of, for example, people denying climate change?

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	As in the previous workshop, participants stayed one hour longer to talk in a less formal atmosphere without time pressure. The talks mainly concerned problems related to the role of universities and the lack of motivation among scientists to undertake activities related to the popularisation of science due to the low prestige of such activities, or even discouraging doctoral students from popularising science. Moreover, a long discussion arose about the possibilities of earning money from science communication and how the landscape of activities in this area has changed over the last few years.

Rethinkerspace	Main Outcomes
Serbia	**WORKSHOP 2A: Sensemaking** In this workshop, participants were rather focused, engaged, demonstrated an interest in the activities, and engaged in discussions. There was a very strong emphasis on the role of critical thinking and how the level of uncertainty in the Covid19 pandemic has affected their work. Participants were rather pessimistic on the task of overcoming the known challenges to effective scicomm. There was enough criticism on the role of professionals, experts, and mainstream media regarding the Covid19 pandemic and confusing public information. Rethinkers were happy to continue to participate in upcoming Rethinkerspace activities and attend new workshops. **WORKSHOP 2B: Assessing science communication quality**

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	In this workshop, participants engaged with both content (and activities) and were involved in meaningful discussions. Rethinkers were happy to continue to participate in upcoming Rethinkerspace activities and attend the next workshop

Rethinkerspace	Main Outcomes
Italy	**WORKSHOP 2A: Sensemaking** Participants were at first overall surprised by the research outcomes presented. Some of them asked why we did we not ask to interviewees specific questions regarding scientific or communication aspects of the pandemic crisis, and most of them struggled with seeing the relevance of the interview outcomes both for their work as science communicators, but also for science communication in general. One participant commented that it is normal that participants only focused on the relationship with their family or inner circle of friends, or their professional struggles, when asked such generic questions. In the second part of the workshop, participants started reflecting on the fact that maybe the high level of attention that they assume people pay to data and to scientific information shared around COVID-19 is actually not so relevant. They started questioning the importance of their role as science communicators on one side, and criticizing the apparent lack of interest towards scientific information of the interviewees as it appears from the interviews. It would probably have been interesting to run a second part of the workshop at a later time, as just towards the end of the workshop participants had started reflecting about the usefulness (or not) of what emerged from

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	interviews. One interesting reflection from one participant was for example that science communication could "inspire concrete actions with an impact on society, not only norms on how to wear a mask". It took long for participants to put aside their strong views on how communication around COVID-19 went in Italy (the facilitator had to remind them several times to focus on the sensemaking outcomes, as the conversation was frequently shifting to commenting on things that had happened in Italian media). **WORKSHOP 2B: Assessing science communication quality** One of the key aspects that emerged from the discussion with the participants was about the importance of the sources of information. While on one hand all participants talked at length about the importance of clearly stating what the source of the communicated information is, and all possible aspects related to it, on the other, participants also mentioned that nowadays, it is becoming more and more difficult to understand which sources can be trusted, even within "official" ones, as the level of uncertainty is very high. Thus, participants suggested that "More reflection on scientific research quality should take place within the scientific community itself." Another interesting point was on "training scientists to have a broader perspective: which position they occupy with respect to society, what are the mechanisms that "determine" science in general and their research in particular". Finally, several participants mentioned the importance of training scientists to develop communication skills and be aware of how communication works.

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Rethinkerspace	Main Outcomes
UK	**WORKSHOP 2A: Sensemaking** When presented with the results of the UK Rethinkerspace, the participants were surprised that many different sources other than traditional media were used by the research interviewees as sources of information in relation to coronavirus. This made them reflect on how small a roll formal 'science communication' plays in the sensemaking practices of many. One post-it on Miro read: "We assume people will listen to us as science communicators – but [is] any of it working if people are just going with pre-existing beliefs?" The extent to which people's sensemaking practices were informed by pre-existing beliefs was a particular source of surprise and concern. In terms of how science communicators thought the sensemaking research may shape their own practice, there were suggestions around making connections between science facts and people's lived experiences and developing a much more refined, detailed, understanding of target groups. One participant stated that they should consider their own biases as science communicators – a reflection that a communicator's sensemaking process is part is part of communication. Similarly, another individual suggested "normalising or incentivising" science communicators to challenge their own assumptions…and "create safe spaces for them not to be the 'expert'". One group suggested there should be more support for science communication to listen to people's experiences. Also, one post-it note on the Miro board read "Create ways to connect science communicators with people who could help deliver their messages or provide feedback"

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	When summarising their thoughts at the end of the workshop, one group's Miro post-it read: "Compassion is the key to engaging." **WORKSHOP 2B: Assessing science communication quality** The UK Rethinkerspace members had some creative ideas when considering their own quality criteria for science communication online. These included considering the cumulative effects of mixed media – image, text and video, avoiding outdated stereotypes of science and scientists and ensuring that science communication is inclusive – representing different points of view. Several references were made in these suggestions to using reliable sources of information and related for this for it to be easy for readers to find the source of information used in a communication. Some Rethinkserspace members commented on having communicators themselves who have authority, such as having an author who is a "well qualified writer or journalist". When considering ways to ensure that science communication is implemented in practice, suggestions included having education in schools to teach children how to critically evaluate scientific information and working closely with social media giants to bring about some form of control over the science communicated. Working with social media platforms was also a suggestion from the science communication academics. Another suggestion made by the academics that was popular with Rethinkerspace members was the idea that assessments of quality rest with individual audience members. When drawing their thoughts together towards the end of the Rethinkerspace meeting, two groups suggested having community groups that can fact check and verify information online. One group commented that it was not feasible to select one specific measure to promote quality over other suggestions,

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	saying that measures can only be effective if several are implemented together.

Rethinkerspace	Main Outcomes
Sweden	**WORKSHOP 2A: Sensemaking** The discussion in this workshop circulated a lot around the need for inclusive, accessible and clear science communication. Personal and friendly communication was brought up as one way to make use of people's sensemaking strategies when communicating science. Another important factor for success, according to the group, is collaboration and bridge-building between different societal actors. To collaborate with actors that have good contact within local communities was seen as a good strategy. **WORKSHOP 2B: Assessing science communication quality** When discussing quality, the participants favoured systematic and long-term changes in order to promote quality in (digital) science communication: More resources to science communication, systems rewarding science communication, and to foster media literacy among the audience and a culture where we can discuss openly and constructively were mentioned. But, also, more direct interventions as countering false claims with evidence. The end of the discussion circulated around issues with measuring quality in science communication in today's digital landscape. What indicated good communication in the digital landscape? A comment? A like? Some participants said that they prefer to have a more long-term focus when

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	evaluating their science communication and not focus solely on the figures the digital networks can provide us with.

Rethinkerspace	Main Outcomes
Netherlands	**WORKSHOP 2A: Sensemaking** In relation to sensemaking there was an emphasis on emotions in the workshop. Here are some important points raised: • Fear works both ways: people start looking for information, but it can also have the effect of protecting themselves. • People react differently to emotions as strong as fear. • There are many variables one may be responding to. It could be responding to fear, to context, to particular world views. • When communicating you always have the idea that you have to connect with the thoughts that your readers have. What is really the reality now is that people are so suspicious. This is very strong. That seems to be a very difficult point for science communication. **WORKSHOP 2B: Assessing science communication quality** Participants found "recognize quality in and appreciation of science communication" important. Scientists are more often asked to think about science communication quality [e.g. 'how' do you communicate 'what']. This does not occur often with and practitioners/science communicators. Here are some important take-home points:

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	• Science literacy is an important aspect of scicomm. It is crucial to strive to increase overall science literacy, to increase awareness of (type of) knowledge claims. That people know how to estimate how reliable science is. • Relevance to the audience is fundamental: 'checkability' of the scientific knowledge presented. But, scicomm has to be done in so many places that one may ask how feasible that is. • At the scientist level: one may focus on knowing together. if you all decide to do or communicate, for example, what climate scientists have 'agreed', you will come a long way.

4.3 Observation and outcomes from Workshop 3

In its first phase, focusing on "understand", the RETHINK project explored the current science communication ecosystem in the light of two trends: science opening-up to society and digitalisation. It has brought to light that the current scicomm ecosystem is complex: there is an overload of (mis)information presented online, the media landscape is fragmented and holds new players, new voices - all with their own values and worldviews. This resulted in changed roles for science communicators, a need to find workable quality criteria for the complexity of digital science communication and an increased focus on the individual sensemaking processes of citizens on science.

In this set of workshops (3), the RETHINK project is looking into how to "develop and experiment". It attempts to move beyond understanding the current challenges & opportunities in the science communication ecosystem – and instead focus on developing and experimenting with strategies that enable science communicators to deal with identified challenges. We feel that openness and reflexivity are crucial in facilitating constructive public dialogues on science. As described in Deliverable 2.3, openness is the willingness to seek out or thoughtfully engage with new information and other perspectives that potentially contradict your own views, whilst postponing judgement and being willing to potentially change your own perspectives and viewpoints. Reflexivity is being aware of and thinking critically about your own assumptions, perspectives, and ideas; and how these shape your communication activities, influence what you communicate, and shape the interactions with your audience.

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Each Rethinkerspace recruited volunteers, who have been asked to explore the value of openness & reflexivity for their own science communication practice. With this, we hope to develop and experiment with strategies that help practitioners become reflective practitioners - which enables practitioners to navigate through the digital science communication mud and help shape a public discussion on science that is more 'open and reflexive'.

This is a summary of the objectives of workshop:

- **Explore the need of openness & reflexivity for the practice of science communication**
- **Reflect on experiments conducted by Rethinkerspace volunteers**
- **Call to action: Develop new experiments together with Rethinkerspace members for their own science communication practice**
- **Offer input for WP2 deliverables 2.4 (Develop and test strategies for science communication practice to open-up sensemaking practices) and 2.5 (Collect best-practices)**

4.3.1

In the following tables we have attempted to summarise the main points from the third set of Workshops in the 7 Rethinkerspace hubs

Rethinkerspace	Main Outcomes
	Overall the workshop fully achieved its main objectives: exploring the role of openness and reflexivity in the practice of scicomm, discussing the results and the experiences of the three members that had been part of the reflective experiments and having participants coming up with new ideas on how to put openness and reflexivity at work in their own scicomm practice. Participants contributed to the definition of openness with useful insights focusing on: • Communication, with an emphasis on listening

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Italy	• Mental openness to different practices and readiness to listen and understand diversity • Transparency in general and transparency of processes of decision-making and data, as it was commended that often the decision processes are not transparent or open. • Role of open science and open source Here are certain extremely useful contribution: • "True openness and reflexivity cannot only happen on a personal level but to be truly effective it should happen on a collective, practical level. Science is a collective practice of making sense, so it should include collective processes of reflexivity. Only the relationship with what's different from me, with different points of view, can facilitate reflexivity. I believe these moments are missing in the scientific community". • "In hindsight, reflexivity could help improve the future of science communication. Openness instead improves communication from the beginning, making it not only clearer but also more interesting" Another significant aspect of the discussion concerned the existence of a good debate and reflection on the lack of data and trials on the female body. The role and responsibility of the science communicator was discussed as to whether it is his/her job to promote gender equality in research.

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Rethinkerspace	Main Outcomes
Poland	The participants agreed that it would be useful for science communicators to further work in meetings where they could analise their work, the tools used, but also their reactions and barriers. **On Openness and reflexivity:** • It may be too general; it can be used in many industries, not only in scientific communication. It can work better in direct one-to-one contact. It is difficult to apply to larger events. • Workshop participants reported the need to develop protocols of proceedings in scientific communication. It requires a lot of time and would be very difficult to apply in urgent or conflict situations. • You can occasionally use openness and reflexivity, but it may not be possible to use it every setting. • It is necessary to explore the limits to the openness of science communicators. Science communicators must know their limits, which may differ from person to person. Total openness to a recipient with different views may be misinterpreted that we accept the other person's opinion as true. Many participants recognised the concepts of reflective practice and openness and said they themselves try to implement these in their daily work. The discussions revolved a lot around what systematic changes the participants wished to see in order to promote openness and reflexivity. This might be a reason to why the participants had a harder time to execute aspects of the workshop that focused on what they could do.

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Rethinkerspace	Main Outcomes
Portugal	**Reflective practice and challenges** Participants reflected upon the identified challenges. They all agreed that the covid pandemic, lockdowns, the social environment and the information overload are extra-challenges to the regular practice of scicomm. It became harder to reach general audiences and deal with misinformation. In discussing feelings towards these challenges there was a discussion of anger and frustration, but empathy too. The prevailing reaction was that of disappointment. On overcoming this situation, there is an agreement that it is essential to listen carefully what the audiences are saying. Again, pessimism on turning things around and making scicomm more effective was dominant. **The value of openness & reflexivity for different practices of science communication** Rethinkerspace members reflected and shared their experiences and views on openness and reflexivity and how these values could improve their scicomm activities. There was a wider and consensual understanding that openness and reflexivity are quite essential for good pieces of science communication and to reach audiences or be aware of the social role of scicomm practitioners. They identified some situations where openness and reflexivity could have improved the communication practices. The example of vaccine hesitancy openness and reflexivity in scicomm allows the practitioner to take into

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	consideration people's legitimate fears, rather than focus only on technical language. It could also help understand degrees of hesitancy and militancy. **Enhance openness & reflexivity practices** Rethinkerspace members reflected on how they might enhance openness and reflexivity. Regardless of their different professional practices and backgrounds the following thoughts were shared among participants: the importance of listening to others in reaching audiences, filling the gap between science communication and society with an open and reflective approach. These were the questions addressed: How can we discuss issues more effectively? How can we build up better arguments? How can we get young people to read the news? How can we have more time and larger teams taking up scicomm? How do we guarantee that the science communication processes integrate the citizenship mission? And these are some attempts to answer them with practical solutions: • Communication offices - which are mediators of these processes - with more "power" in the institutions • Greater thinking ability instead of just performing automatic tasks • Bring citizens on the discussion and debates, hear their doubts and concerns and provide them with clear explanations • Create opportunities (financially, time, etc) for scientists to invest a comparable time in communication that they invest in the research • Design specific activities to specific target-audiences. • Full transparency of communication (language, data, etc.)

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Rethinkerspace	Main Outcomes
Sweden	The participants agreed that it would be useful for science communicators to further work in meetings where they could analise their work, the tools used, but also their reactions and barriers. Many participants recognised the concepts of reflective practice and openness and said they themselves try to implement these in their daily work. The discussions revolved a lot around what systematic changes the participants wished to see in order to promote openness and reflexivity. This might be a reason to why the participants had a harder time to execute aspects of the workshop that focused on what they could do.

Rethinkerspace	Main Outcomes
	The workshop was dominated by a good amount and high quality of design questions and solutions. During the workshop, contribution and shared experience in reflective practices, and active participation in discussions were valuable. Here are few highlights:

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Serbia	Participants focused on defining general challenges and issues about the scicomm ecosystem in Serbia There was an emphasis on certain negative emotions such as frustration, anger, disappointment, fear However it emerged that there are plenty of opportunities for improving the Serbian scicomm ecosystem, especially in the field of social media (this was a collective conclusion). An extremely most useful and interesting aspect of the workshop was gathering around the same problem and identifying the emotions that overwhelm science communicators in troubled times. As a group, we found that those are the same emotions that each one of us feels, and that is where we found the most room to rethink our practices. Sharing stories in a reflective way inspired a discussion on improving scicomm practices.

Rethinkerspace	**Main Outcomes**
	Rethinkerspace members reflected on a wide range of situations. One mentioned was related on how they had seen scientists who were questioning government COVID restrictions in terms of their effectiveness “get shouted down” and another described the challenges of trying to communicate drought with members of the public on a gloomy winter day in London. Collectively, they described a sense of frustration and feeling defensive. In terms of what they felt informed their feelings, they described a mix of things, including “occasionally

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UK	me not understanding the social, cultural and economic side of things." (the discussion about the garden). The Rethinkerspace member who described challenges communicating drought said: "I assume the majority of public don't understand water resources. I suppose the challenge to me is that they need to know there is a problem and what we need to them to do to help." When asked whether they thought it was possible to reach the person or change the situation, responses were mixed – with a roughly equal number saying yes, maybe and no. • In the plenary discussion about openness and reflexivity, one Rethinkerspace member commented on how personality type may influence the extent to which an individual is open and reflexive. Another commented on how they tried to integrate openness and reflexivity into their work practices, particularly when reaching out to specific audiences. • Rethinkerspace members also reflected on experiences in some experimental work led by VU Amsterdam in which she attempted to integrate openness and reflexivity into her working practices. She described how she had conducted a brief survey with listeners to the local radio show she was part of to understand more about their perceptions of the coronavirus coverage on the radio station. • After developing some aspirational goals, they were asked to formulate a 'design question' that might help them to achieve these aspirations. These reflections included: "develop communications that respond to audience values" and "communicate with more personality and empathy." Also: "How might we create safe spaces for those with opposing views to have a purposeful conversation?" • Rethinkerspace members offered suggestions to improve their scicomm approaches "using consultation groups at key points in projects." Another described an experimental project that would involve:

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	"working with other community partners on a smaller scale would be beneficial."

Rethinkerspace	Main Outcomes
Netherlands	These are main points taken from Workshop 3 • "There is no such thing as a single type of science denialist but rather many versions. It may well be that in each of us there is a little bit of anti-science. The Netherlands will be a little better for some if we show more understanding of these types. But do we have to understand all of them? There are some that we cannot or will not understand. Should we fully oppose them? Is that bad? • It's clear that we can make a positive improvement with Openness & reflexivity. But we can't fully grasp that one yet. How does this improve the science-society interface? What should we strive for? Do we need to convince citizens of something? Or should we strive for peaceful coexistence? Is a better atmosphere - brought about by the therapeutic value of science communication – a goal in itself? Or a means to a greater end? If so, what is this goal? • Openness & Reflexivity are important and useful. But how can we scale this up? Should we also treat this as a governance or policy issue? And if so, what would a valuable intervention or policy look like?

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4.4 Observations and outcomes from Workshop 4

The main objective of the workshop is to let Rethinkerspace members look ahead and brainstorm about practical application of the learnings they gathered throughout the project and think of the opportunities, new connections and collaborations they would still ike to establish to strengthen and continue the networks in the future.

The workshop consists of certain modules which one can adapt according to needs (with help of 3 final videos synthetizing in a short way the main findings).

For each module we are giving some kick-off questions to facilitate the reflection, brainstorming and planning in the group. They are in form of MIRO board but can be done easily on a flipchart with post-its in case of the physical meeting.

The main goal is not to go through all exercises but to let members express themselves and think of their own needs to improve their science communication practice, so you can use provided tools in a flexible way.

The main output from the workshop has been a list of prerequisites, wishes, concrete requests that would help the participants to put their ideas into practice (it can relate to make certain connections with other stakeholders etc.). On the individual level it should help the participants to make an action plan for enhancing their science communication practice.

4.4.1 Synthesis with a note on lessons learned

In the following tables we have attempted to summarise the main points from the fourth set of Workshops in the 7 Rethinkerspace hubs.

Rethinkerspace	Main Outcomes
Portugal	Rethinkerspace members reflected on what they have learned along the way and brainstormed on what their individual and collective outputs can be beyond the project. **Quality of science communication online**

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	Overall, Rethinkerpsace members agreed that we need to embrace diversity of audiences, diversity of quality criteria and the difficulty to assess the objectives of good science communication. More individual and qualitative tests are needed to evaluate how are we reaching different audiences. Rigorous and transparent communication is a fundamental part of the process, as the COVID19 information approach showed clearly, and reflexive practices must be reinforced. **How to reach underserved audiences** Rethinkerpsace members discussed about the importance of context and which role must we play in order to fit the expectations of a given audience. A main concern came out that we may still not know how to reach underserved audiences. Members targeted three main categories of underserved audiences: • ethnical minorities, • economically disenfranchised • neurodivergent people. Some strategies to try to reach them emerged from the discussion: working together with local NGOs, community leaders and organizers, medical and paediatric associations, schools. Overall, partnership with structures that are on the ground and try to bring science into their daily life. **Making sense in science communication** The Sensemaking protocol, as seen in previous workshops, is a powerful tool to reach the targeted audiences, sometimes at an individual level. Members agreed that this is a valid way to explore in their future work. Main topics on this subject were stressed out:

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	• the importance of the context (social, familiar, professional, moral) in the way people make sense on information • the importance of emotions and how they feel about some information («how can we make people less angry?») • the importance of actively listen to people's needs, feelings, values. Some strategies were pointed out: • the need to improve critical thinking and media literacy • work closely with civil society • the need for investment in more projects that can measure the effectiveness of science communication and compare audiences; international projects than can help to clarify procedures and goals • partnership with data scientists, journalists, or social scientists • try to present information in different layers, always clearly, so that can be understood both by specialists and non-specialists. • define a strategy and crucial role that science communication can have in some challenging questions of our times, such as disinformation or the rise of anti-scientific movements.

Rethinkerspace	**Main Outcomes**
	Participants addressed the role of self-regulation in enhancing the quality of scicomm. In addition, quality needs to be explored in light of the purpose of the undertaken science communication. And as science communication can have multiple purposes, it is hard to pinpoint general quality criteria.

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	Some key actors that were identified in order to stimulate communication training for PhD students are university management, doctoral supervisors and research councils.
Sweden	The Rethink video on underserved audiences sparked a discussion on how to conceptualise an underserved audience. It is important not to equalise underserved audiences with vulnerable audiences. An example that was highlighted is that prisoners might be both a vulnerable and an underserved audience, whereas for example business leaders might be underserved and hard to reach in some aspects, while they hardly could be seen as vulnerable or marginalised. Another discussion that emerged from this video is the specific competencies that come with being a science communicator. In this sense, the lack of education programmes for science communication practitioners in Sweden was discussed, and one of the participants suggested a study to map what educational and professional backgrounds science communicators in Sweden usually have today. The Rethink video on sensemaking in science communication lead to a discussion that largely focused on the Corona pandemic and the challenges this has brought to science communication. Something that was seen as very important is to put more emphasis on communicating the nature of science and the process in which science is being made. The “messier” parts of science, with more uncertain knowledge, have been prominent in the media reporting about the pandemic. This has led to citizens being surprised to see scientists disagree on issues, even though this is normal within the scientific community. An increased scientific literacy about the nature of science would help people make sense of that knowledge and results are in constant motion and why scientists can interpret the same data in different ways.

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	Given the sensibility of the pandemic and the strong feelings that are evoked, communicating the "how of science" was considered crucial for the future trustworthiness of science.
Rethinkerspace	**Main Outcomes**
Italy	Participants addressed the role of self-regulation in enhancing the quality of scicomm. In addition, quality needs to be explored in light of the purpose of the undertaken science communication. And as science communication can have multiple purposes, it is hard to pinpoint general quality criteria. The workshop allowed participants to look ahead and brainstorm about practical applications of what they learnt during these 2 years and a half with RETHINK and come up with ideas for new opportunities and collaborations they would still like to establish to strengthen their networks in the future. From the very beginning, while illustrating the agenda, the host underlined the active role of the participants: everybody should feel free to express their views in a flexible way. The outcome was also clearly specified: at the end of the meeting everybody prepared a wishlist for rethinking science communication and summing up their ideas/suggestions/takeaways from the three main themes researched within the project: sensemaking, underserved audiences and quality of online scicomm. The workshop began with a poll through which participants selected the two topics Underserved audiences and Sensemaking to reflect upon. To start the reflection the corresponding videos were shown and then, individually, participants worked in the Miro board.

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	During the reflection on the missing roles in communicating with underserved audiences, participants pointed out that a more hybrid and inclusive role is missing. The broker could play this role, but the term “broker” relates to financial issues and it is identified with someone who deals with money, which doesn’t seem appropriate in this context. Bridger would be a better choice. Other participants identified with roles such as the explainer. Also, the role of the listener was deemed rather beautiful and needed. It was suggested to use these roles in the future: for each project one make can a checklist of inclusion and verify that all roles are covered, as all are fundamental. Naturally, a person can play more than one role. Is there anyone who oversees listening? Is there anyone who is the enabler? Following the video on Sensemaking, the first comments were that many questions were left open. The problem in communicating science-related issues is that we do not communicate a product but a process, and we must invent a new sensemaking for each person. The big question is always the same, to give sense to what we do, also with respect to the previous topic of underserved audiences. The problem is systemic and connected with all we do and who we are. As regards the polarization we face nowadays regarding the pandemic, scientists must become aware of the very complex dynamics taking place and learn to take this complexity into account when communicating. Memory and its loss (people forget everything very fast) should be an issue to focus on in our next communication project: how could memory help us and the public to make sense of our experiences?

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Rethinkerspace	Main Outcomes
Serbia	These are the major learning outcomes from Rethink that participants shared in this workshop **Quality of science communication online** What has been learned: • Let us pay attention to the difference between adopted and new scientific facts • The complexity of science communication puts us in a situation that we are not aware of which audience we are addressing • When placing scientific content, the most important thing is to determine the target group and understand its interests • To have more understanding towards the audience that does not share our views Questions to help enhance scicomm: • Are there objective criteria that would assess the quality of SC? • Where is the line between the promotion of science and the sensational connotation? • Where are the boundaries between PR and science communication? • How to make science communication popular? • What is the most effective approach for breaking myths and misinformation? • What are the experiences from others? • Why do people believe in conspiracy theories and pseudoscience? • How to harmonize the requirements of digital communication with the vision of scientists and what will be the outcome? • How to communicate the importance of preventive health practices?

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	• How to approach an audience that does not react to arguments and facts? • What about the scientific process itself? What could be the criteria: • Some kind of review by competent experts • Authentic information: Sources, verifiability • An increased number of followers of scientific blogs, web pages, articles on portals, etc. • Reducing belief in pseudo-science, by placing acceptable scientifically based content • Increased number of educational programs, adapted to different educational and age groups (Strategies - monitoring and evaluation) • Increased trust in science • Selection of the target group • Education, development of critical thinking • Presentation, receptivity to the audience • Communication understandable to everyone • Work on communication with scientists • Open exchange of opinions and constructive conflict and understanding of different views Who would we like to cooperate: • With scientists • Maybe with marketing experts • With psychologists and communication experts • Experiences of science communicators (training, coaching, debate on SC) • Health institutions, researchers, peer educators • With the media

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	• With those who share the most information and reach the largest audiences **How to reach underserved audiences** What has been learned: • It is significant to define the target group and understand its interests when placing scientific content • Increase understanding towards the audience that does not share our views; • To constantly adapt to new audiences, their language and symbols. • Although there were some points of view that we should attempt to reach the audience as much as possible, the prevailing opinion was to determine the target group(s) from the start. • Complexity of SC ecosystem (perhaps roles could facilitate positioning in SC practice) Questions to help enhance scicomm: • How to motivate the audience to get involved in the process of (two-way) science communication? • How to choose people for the right target group? • How to influence the audience to think critically? • How to present complex scientific discoveries closer to citizens? • How to prevent pseudo-scientific attitudes? Is this can successfully be resolved in a sc way? The effect would be just the opposite, given that critical thinking could be pointed to current scientific content (example of a pandemic)? • How to approach an audience that does not react to arguments and facts? • How to reach an audience with (extreme) unscientific views through facts and science?

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	• How to approach the people who are closed down to any information that does not match their beliefs? Which 'new' audiences would I like to reach? Which role would I adopt to reach them? • The individuals who are interested but may not know quality scientific sources, magazines, portals, blogs, etc. (popularize them) • Children in primary schools - on workshops and current digital networks that are popular at that age • Professors at high schools - point out the importance of science communication • Entertainer to reach the insufficiently educated part of the population • The roles of listeners, educators and entertainers for audiences who have doubts about scientific information • If someone has the opportunity to master the roles (more of them), that would be a great success! • Decision-makers: Ministry of Education & Science above all, and those who design compulsory school programs • There is not enough space in the primary school curriculum for critical thinking improvement, which is the basis for understanding science. In that sense, the role of educators is crucial and teachers should apply sc in their classes. How would we do it? Who would we like to cooperate with on this? • Media: TV, print, digital • Media, NGOs, marketing and PR, educators, institutions • Educational workshops/courses • Quality identification of the target group • Training for each of the roles we talked about

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	• Actors, influencers, media personalities in popularizing critical thinking • Teachers, school principals, NGOs and state institutions such as CPN • Working groups formed to implement better science communication in schools • Creative dialogue like these workshops, science cafes, exhibitions, connecting the general public/citizens **Making sense in Science Communication** What has been learned: • Short, unambiguous information tailored to target groups • Presentation of facts that are verifiable and scientifically "recognized" in a clear way • The application of reflective practice in science communication is necessary due to the complex reality in which we live Questions to help enhance scicomm: • How to help the audience think critically? • How to bring complex young scientific discoveries closer to young people? • How to educate a group of people who are closed to any information that does not match their beliefs? • How to encourage two-way communication? • Mainly, we come across comments such as "Algorithm allowed this and…". Will the achievements of advanced science, such as artificial intelligence, facilitate the flow of vast amounts of information or not? • How to make scientists aware that science serves all people and everyone should be involved? • Why are people more inclined to believe anecdotal examples than scientific results on large samples?

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	Support the public in making sense of science-based issues by attempting to: • Communicate critical thinking and filter information • Include formal and informal approaches in scicomm • Use information that encourages people to reconsider their pseudo-scientific arguments • Enable the general public to ask a question and get an answer from the scientist (Questions and answers - on the FB page, an example) • Work with content that is understandable, easily accessible, and accurate • Ask questions to people who propagate pseudo-scientific beliefs and wider misinformation - open communication and listening What would help us achieve the goal? Who would we like to cooperate with? • Media, social networks, communication channels • Kindergartens, schools, high education institutions, media and social networks • Training, debates on scicomm; experiences of other scientific communicators • Educational institutions, media

Rethinkerspace	**Main Outcomes**
	These are some very interesting points relating to issues discussed in the previous workshops:

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Poland	• It is hard to communicate scientific content without the focus on the audience, without their understanding • It is important to pay attention to the moment when somebody's opinion on a given topic was being formed (not only "where do you know it from", but also "when did you get to know it?") • A big percentage of people does not consider any source of information reliable, to which they could turn in a moment of insecurity • The value of the message (facts) although important – has to go hand in hand with the way of expressing thoughts (style of transference) • We cannot blame our recipient for not understanding us if it was us who chose inadequate way of expressing thoughts • Emotions related to family and friends are important • Close experiences are the most important for people, so is anecdotal proves, evben gossip. Statistics doesn't count as much • Let us try to construct our message in a way that is easily told to others (like a "gossip") – you have to give something easy to remember • Retrospective approach allows "change" of opinions • Making experts aware how people try to relate science to their lives and experiences in difficult moments/subjects • By convincing, we arouse emotions (positive best), let us not bombard with knowledge. Showing understanding for the other person at the same time – even if they're mistaken, it can be a combination of a thousand circumstances, not their "fault" • People who come across scientific content come from very different backgrounds, we should try to understand why they form given opinions • We should start communication with considering why people on the other side think what they think • Looking for common, rather universal experiences as a common ground for discussion • Asking workshops/lectures participants more questions

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	• Using various forms: from simple/short to more complex, more fact informed • We do not only say what we know, but also where do we know it from; we fight for the "silent majority" of the audience, which can have doubts • Trying to foresee gaps in our messages so that we can bridge them straight away • Share simple stories • Consider recipient groups of your message, "what are their emotions?", "What dilemmas do they have?" • People believe what fits their convictions, it's the same with science – you have to fit their emotions and the way of thinking in order to get the message across • Remembering that facts are only a part of the story. Add emotions, contexts and experiences • Not only talking but also listening • Some bridges must be destroyed in order to build something new in their place • There must be a link with emotional or personal charge • Considering how the target group is emotionally attached to the topic • Individual examples do not give a broad knowledge • Often it is a family or a situation which is empathized with, possibly understanding that somebody's intentions (e.g. government's) are different • Asking yourself the question "do they care?" (Before this, facts do not count) • It is possible to be prepared for a few standard reactions to the information and have a strategy for dealing with further discussion • It is very difficult to break a concise conspiracy narrative These are the main outcomes from this fourth workshop:

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	• Workshop participants are eager to connect with colleagues from other Rethinkspaces or to participate in joint workshops. • They see the possibility of applying the tools developed during the project • They see the need to continue meeting and discussing on a professional level • They would like to continue sharing good practices • They are interested in looking for solutions to the ills of the science communication environment The greatest emphasis was placed on the creation of joint plans by the participants and defining the scope of cooperation among them.

Rethinkerspace	**Main Outcomes**
Netherlands	In this 4th Workshop the overarching theme/guiding question was how, in a moving landscape of digitization and open science, can we better match science communication with social needs? These are the main pints in the attempts this question: • The communicator finds it difficult to estimate who is the recipient of content • Who is the other? and how to reach? • Misinformation and polarization • Abundance of information, values and voices in public debate • The science communicator can form the bridge

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	Sense making perspective in science communication: A way to get to know the other, but also to learn to understand yourself as a science communicator, and why you feel a disconnect with your audience. Many still have the question "what do we define as science communication, and who is the science communication practitioner? What is, then, 'good' science communication?" • Participants felt that scicomm is not a priority for organisations or institutes. Culture is very important, and conversations with young researchers are a testimony of that. • And doing science communication, often the question that pops up is: where are you doing it for? Or who are you doing it for? What should be the purpose of scicomm? What will go wrong if nothing changes? • More information = more fuel on the fire with supporters and opponents • Citizens want more transparency. But if you provide more information, people will have more trouble interpreting. The public perception of science is positivist, but it is actually constructivist. In this workshop there was also an attempt to answer the question: "Why do we conduct science communication? What is our goal?" • Because we are intrinsically motivated to give back to society, to help people make sense of what goes on around them, but also to gain new insights through this interaction with people themselves, to foster mutual understanding. A large group of people is angry, feels unheard of. Shouldn't we listen to them then? At the same time, this group adheres to more and more conspiracy theories, is it really necessary to

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	try to reach them? Shouldn't we focus on those who are easier to train, especially through education? And who is responsible? What should we do? • That is difficult, but the will is there in many practitioners. Yet, still many organisations where motivated scicommers gather still see scicomm as PR and promotion of universities. We should change this culture. • But there is the feeling that a transition is going on, that more awareness is coming. This also introduces new problems: how can we find out what effective or 'good' science communication is? Need for quality criteria and ways to measure or assess if these criteria are met. • But, it is very hard to measure this effectivity. And, should scicomm be about effectiveness, or is there another purpose for scicomm? For example, science communication is so diverse (think about difference between transmission and transaction); you cannot really say anything substantial about scicomm if you do not know the context.

Rethinkerspace	**Main Outcomes**
	When considering quality, participants commented that the context of the communication activities was important. Participants observed that there are different types of digital content and these different contexts (such as different social media platforms) shape what is good quality. Participants also raised a question about how quality can be ensured when research is sometimes misinterpreted online and researchers are trolled or attacked.

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UK	There were questions around how quality criteria would need to adapt as the nature of online spaces for communication evolves – and specifically, how can we be prepared for these new contexts? It implies that quality criteria need to be fluid and evolve over time. Concerns were raised about the practicalities of finding out about audiences online to adapt content to these audiences to ensure quality. A suggestion was made to explore outside the science communication sector for answers – specifically from digital engagement specialists. When looking at the research into underserved audiences in science communication, participants commented on the breadth of audiences considered underserved by science communicators in our research. They also said that the research within the project had raised their awareness of creative ways to involve people in digital spaces, which had informed their practice. When looking specifically at the new roles to reach underserved audiences (research presented in D1.4), Rethinkerspace members wondered the extent to which communicators shared what they did and whether it worked or not. They said that more spaces are needed for science communicators to share good practice; things that have worked well - as well as their mistakes. When presented with the research and insights into citizens' sensemaking practices during the coronavirus pandemic, participants commented on key insights from their perspective - one being the way in which people use their own personal networks to inform their perceptions and decisions, particularly at times of crisis and change. They also commented that the insights in RETHINK research echoed some of the vaccine hesitancy and anti vax research literature. One of the Rethinkerspace members said that she wondered how some people break out of the cycle of their opinions being informed by those of relatives – such as being pro vaccine

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	after living in an anti vax household growing up. They also questioned how science communicators could learn more about people's networks and trust levels in a fast-changing situation such as a pandemic.

4.5 Workshop 5: Sustainability of Rethinkerspaces

The final event in this series of Rethinkerspace workshop brought together all participants from the 7 country Rethinkerspaces in a unique meeting focusing on experience-sharing, community building and sustainability.

Participants were involved in a series on activities with an emphasis on "speed-travels" to the 7 Rethinskerspace hubs, in which hosts presented the outcomes of their workshops on the main themes of the project: Sensemaking, quality of science communication, openness and reflexivity and reaching underserved audiences. The hosts also invited the "visitors" from other countries to offer their perspective on the issues addressed.

4.5.1 Objectives of the final workshop

These were main objectives of the event

- Recap on the Rethink project
- Getting to know the other Rethinkspace hubs
- Getting to know your European peers
- How to make the hubs sustainable, in order to facilitate shared-learning and communities of practice on European level in the future

4.5.2 Main outcomes from the 5th workshop

Rethinkerspace	Main Outcomes
	These were the main outcomes in this final event:

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All seven countries	Funding of science communication emerged as a top issue. Rethink proposes a rather straightforward and innovative approach and tools to build science communication hubs (i.e. future Rethinkerspaces) in research institutions, universities, policymaking organisations, local communities, the media, and elsewhere. But crucially, this approach requires funding and this is yet be achieved in most national contexts. All participants, through this exchange of experiences, came to agree that their contexts share similar challenges. These were the issues that were discussed extensively. • Scientists involved in research are failing to understand and/or value science communication. • Mainstream journalists are lacking the necessary scientific knowledge. • Audiences are wide and diverse, with those involved in science communication finding difficult to locate their particular audiences and knowing what their audiences are seeking in terms of scientific information and knowledge. • Science communication must communicate something bigger than information and knowledge: values. And this is probably its greater demarcation criterion from pure science and knowledge transfer. • The role of emotions in how audiences interact with science is to important to be ignored in strict positivistic approaches.

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5. On sustainability of the Rethinkerspaces and the approach

The Rethink project, in its final stage hosted two major events. One three-day Winter School and a Final Policy Event, the later co-hosted with the TRESCA EU-funded project. The events were attended by roughly 200 people. The Rethinkerspace approach to working with diverse stakeholders in hubs of science communication that function as enhanced networks of peers was discussed extensively in both events.

The RETHINK Winter School 2022[1] was organised for early career researchers, journalists, policymakers, community leaders and all other agents of change with an interest in communicating science in relation to complex societal issues. The Winter School was a great opportunity for those looking to challenge their assumptions, make new connections with underserved audiences, and contribute to an open and trustworthy public conversation about science. There was an increased interest among participants of the events, especially in the Winter School, not only to further work with the Rethinkerspace approach, but also to attempt to facilitate, with support of Rethink partners, the establishing new Rethinkerspace hubs in new contexts and beyond the life of the project.

The TRESCA-RETHINK[2] final event-conference focused on how we can strengthen the connections between various stakeholders and publics in order to more effectively respond to current and future uncertainties. It looked towards a future in which science becomes more a point of connection than one of polarisation. In a series of keynotes, panels, and engaging conversations, panels speakers and participants discussed and co-created how science communication as a practice can build towards public trust, by making new connections and shaping the conversations that matter. The experiences of the Rethinkerspace members were presented, to share RETHINK's insights into both challenges and opportunities, using the themes sensemaking, science communication quality, underserved audiences, and reflective practice.

[1]RETHINK science communication and journalism Winter School 2022. Ecsite. (n.d.). Retrieved March 15, 2022, from https://www.ecsite.eu/activities-and-services/news-and-publications/participate-rethink-science-communication-and

[2] Connections, conversations and science communication – the future of public trust in times of uncertainty. Science. (n.d.). Retrieved March 25, 2022, from https://sciencebusiness.net/events/connections-conversations-and-science-communication-future-public-trust-times-uncertainty

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6. Conclusion

The Rethinkerspace meetings have been valuable networks, wherein SSH scholars, scientists, policy makers and practitioners have had meaningful interactions on pressing challenges and opportunities in the field of science communication. Their insights from local communities across Europe enriched the research conducted in the RETHINK project and ensured a closer integration of science communication theory and practice.

First, the Rethinkerspace meetings on challenges and opportunities in the current science communication ecosystem and the Rethinkerspace members' experiments in their daily practice on roles and repertoires for science communicators, have resulted in important insights. Including a diversity of audiences and their perspectives in science communication outputs and activities, especially in trickier contexts with underserved audiences, cannot be addressed by one-size-fits-all approach. Therefore, flexibility to change between different roles and repertoires, accordingly to what the audience, context or situation requires, has been an important insight that the local Rethinkerspace communities brought to light.

Second, Rethinkerspace members gave valuable input to RETHINK's research into the ways in which citizens make sense of science during the Covid-19 pandemic. At the onset of this study, Rethinkerspace hosts conducted semi-structured interviews in their communities with a diverse group of citizens. The Rethinkerspace members discussed how these insights should and can be connected to, through science policy and science communication activities. Twenty-four Rethinkerspace volunteers experimented with a reflective practice for science communicators in their daily practice, to see how reflecting on their perspective on science-society interactions and challenging their assumptions on audiences; could transform practice and adapt to the personal situation and social contexts – with which citizens make sense of science. Subsequently, their experiences were discussed in Rethinkerspace meetings. The Rethinkerspace hosts and their members have not only ensured a close connection with local communities of citizens and practitioners in the 7 European countries, but also provided the highly valued opportunity to test-out and embed science communication theories in the practice of professional science communicators.

We look forward to enabling the establishment of Rethinkerspaces in the future – for we argue that embedment of scientific research in local communities and practice is essential for science communication as a field to navigate through current challenges. To support the future Rethinkers, the RETHINK project has put together a series on knowledge capsules that offers an easy guide on how to build a Rethinkerspace hub yourself (see Annex 2).

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Annex 1: Report collecting template

reTHINK #scicomm

Rethinkerspace 1st WORKSHOP – Report

Congratulations! If you are using this template, it means that you organised your first RETHINKERSPACE workshop. Remember that in order to prove that you have carried out the workshop, we will need a

We want to know more about your event.

Practical details

RETHINKERSPACE	
Event title	
Duration	
Location	
Number of participants	

Participant profiles

	Name and Surname	**Stakeholder group category*:** scientist, practitioners, citizens, enablers:	**Stakeholder type*:** Scientists, research institutions, PR office staff, museums or science, centre, educators, journalists, interest groups …	**Field of work**	**Gender**
1					
2					

***Tip: Check annex 1 for the full list of categories and stakeholder types**

To help us understand your workshop better, please describe the activities carried out:

Event description

Context of the event (if special)	
Description of how the workshop was run	*Agenda of the meeting, objectives, etc…*
General outcomes	*Summary of the actions carried out and results*
Follow-up plans	
Lessons to share with other Rethinerspaces?	

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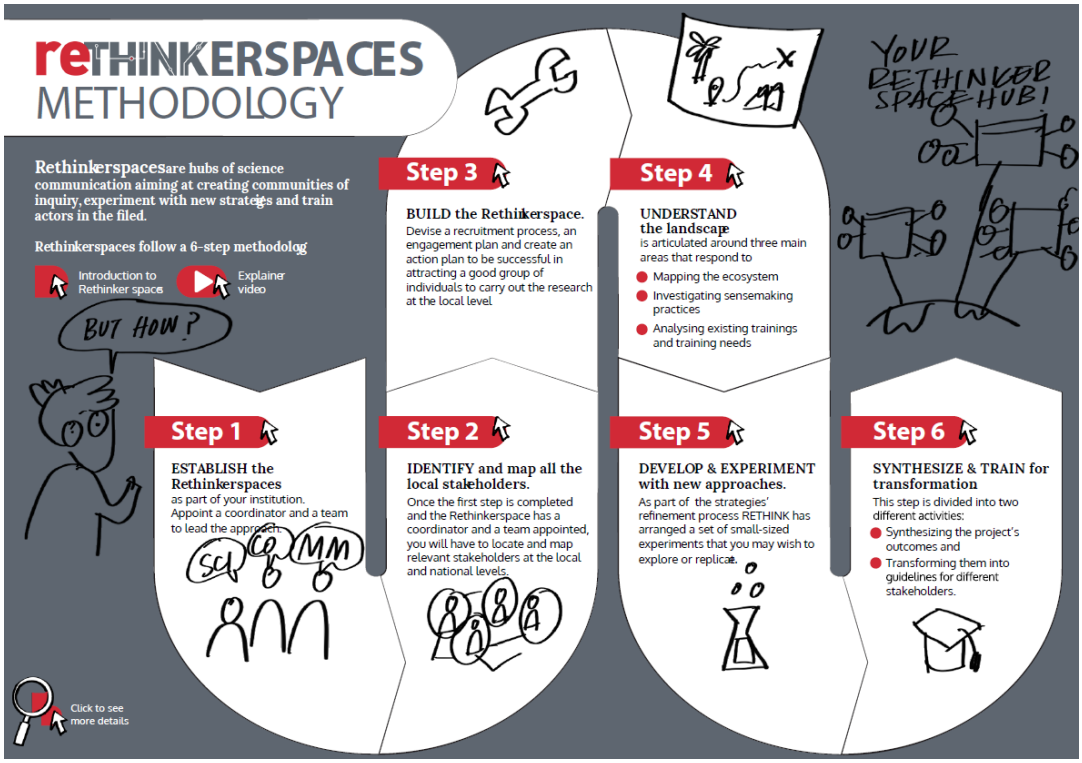
Annex 2: Rethinkerspace Methodology in knowledge capsule



Introduction to Rethinkerspaces

The role of science communication that is to nurture interactions between science and society in an open and reflexive way. The science communication landscape itself is undergoing deep and fundamental changes due to two interrelated changes. First, the boundaries between science and society have become blurred. Interactions and interfaces between science and other fields in society such as economics, politics, art and culture have become more numerous and diverse. Second, digitalization has revolutionized the science communication landscape. It has fundamentally changed how scientists; other R&I stakeholders and a variety of publics interact and communicate.

In the framework of the RETHINK project, Rethinkerspaces are understood as hubs of science communication in charge of creating communities of inquiry to acquire insights into the emerging science communication landscape, map networks, actors, roles and repertoires, contribute to understand sensemaking practices and test a new quality of interactions framework. They also experiment with new strategies and train other actors in new ways of science communication.

Transdisciplinary approach

The problems that are currently affecting science-society interactions cross the boundaries of several disciplines and communities. Rethinking science communication therefore requires a transdisciplinary approach that connects scientific and non-scientific perspectives in a joint process of inquiry and learning. Transdisciplinarity stands for 'a form of learning and problem-solving in co- operation between different parts of society and science'. Solutions are devised in collaboration, or co-created, by multiple stakeholders of various disciplines.

A transdisciplinary approach not only transcends single or individual disciplines, but also the boundaries of the scientific community, to an approach that includes the incorporation of the view of multiple scientific and nonscientific actors, professionals and amateurs. These individual actors should come from a range of perspectives and backgrounds, for example scientists, science journalists, bloggers, influencers, DIY-ers, artists, public engagement professionals, policymakers at local and national level, science funders. They all bring their own knowledge and expertise to the Rethinkerspaces, of which the other members will learn and subsequently integrate this 'new' knowledge into their own field of expertise.

Community of practice

The concept of the Rethinkerspaces is based on the Community of Practice (CoP) approach to social learning. When multiple stakeholders share a passion, interest or a sense of urgency to progress together – often with respect to a specific topic – and form a community around a shared domain of interest this is called a Community of Practice (CoP). Through mutual engagement and by working on challenges in their shared domain of interest, members of a CoP generate innovative and creative solutions, and new practices. The most successful CoPs (1) are driven by intrinsically motivated members, (2) stimulate the imagination of participants, that is they promote 'out of the box' thinking, (3) are flexible and continuously adapt their activities in relation to the context at the boundaries of the CoP, and (4) develop collaborative relationships and mutual norms between its members.

Transformative learning

The challenges identified, the rapidly changing science communication landscape, the implications of digitalization, and the crossing and blurring of boundaries between science and society, require a change of the science communication system. The current system is not arranged and equipped to address these challenges adequately, due to barriers:

- **At the practical level:** motivations and competencies to engage in open dialogue and transdisciplinary research are often lacking.
- **At the structural level:** barriers relate to the (dis)incentive structures that scientists have to obey to, such as metrics, career opportunities and so on.
- **At the cultural level:** conflicting ideologies of science and the role of science in society complicate change.

Indeed, research on socio-technological change has shown that system transformation will only happen if multiple initiatives challenge the "status quo" at all three levels.[ix] In this project we approach it as a *transformative learning process*. Hence the aim for RETHINK is to co-develop a network of science communicators (and other relevant actors in the science-society landscape) that has transformative capacities in realizing a future proof science communication landscape across Europe. Practically this means that (1) the coordinators and members of the Rethinkerspaces themselves become ambassadors of transformation, and foremost (2) that the Rethinkerspaces each facilitate the emergence of a transformative network(s) as well. Through the trainings and tools provided to the Rethinkerspaces during the life cycle of RETHINK, the coordinators will become equipped to facilitate the emergence of new transformative network in their own science communication environment

In order to facilitate learning, Rethinkerspaces should provide a safe space for discussion and also, be the place to find solutions for existing and upcoming challenges. The activities and events organized by the Rethinkerspaces should enable a form of learning that transforms problematic frames of reference to make them more inclusive, reflective and open to change. This requires delving underneath the 'surface' of observable actions and events and reflect on the underlying level of assumptions, values and beliefs that people adhere to. By setting up a learning environment in which these questions are raised and addressed, a new and shared vision on the science communication landscape will emerge, creating possibilities for reflection-in-action.

In this process, new knowledge is obtained – of which the Rethinkerspace members may, again, learn. In this way, knowledge creation is a continuous and shared process. Members will obtain new knowledge, test it in their own practices or field of expertise, and bring their new experiences back to the Rethinkerspace. They are the incubator of shared learning processes that can bring about new knowledge.

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