**Science Communication: Opportunities and Challenges of Rapidly Changing World**

**MODULE DESCRIPTION AND GUIDELINES FOR THE INSTRUCTOR**

The module covers three main topics, - (1) **Growing inevitability of science**. Is there a way for more sustainable living in a contemporary risk society?; (2) 2. **Science communication in the 21st century**. Main actors and changing communication processes; (3) **Guidelines for science reporting**.

First, each topic will be described and discussed by teacher using PPT slides (around 20-25 slides each) in pre-recorded video lecture. Slides will include text, videos, illustrations and schemas to support the oral presentation given by teacher. Each video lecture is followed by LIVE discussion, where students reflect on study material, work in smaller or bigger groups to answer/discuss questions listed by the teacher.

***TOPIC 1: Growing inevitability of science.***

The first topic of the model is aiming to provide students with more general understanding of the role and conditions science and scientists have in a contemporary societies, - the paradox of the second modernity is discussed, when the scientific knowledge, innovations and technological progress is essential but also all these things can generate negative processes and side effects for the planet and human-beings. Therefore, the question is: if there is a way for more sustainable science in a contemporary world?

The list of new conditions for science are addressed and explained:

* Scientific knowledge: evaluating risks in knowledge society;
* Increasing speed of science making and growing scientific uncertainties in the era of post-normal science;
* Trust issues and commercialization of science: common good versus private good;
* Politicization of scientific issues.
* Democratization of science as a solution?

Discussing the following statements and examples:

* **Growing scientific uncertainties in the era of post-normal science**: We (don’t) know what we don’t know: Science and scholarly research produces not only progress and well-being but also may cause huge risks and losses. The stakes are high and risk management is required to assess and control science and technology related risks. In the context of increasing scientific uncertainties, there is a big question of how to communicate uncertain science to the lay audiences?
* **Commercialization and commodification of science: common good versus private good**: Today, scientific knowledge is produced in rather broad, transdisciplinary social, economic, political, and social context (Gibbons, et at., 1994). It is hard to find the dividing line between science and industry, between public interest and private ambitions, between “common good” and “private good”. Scientific research is increasingly nestled down in private patronage (Bauer, 2008) and science step by step is becoming a commodity, which is produced and sold as any other good.
* **Politicization of scientific issues**: ‘Stick to the science’: when science gets political: A three-part podcast series explores the intimate relationship between politics and science. Accessible here. “Politicization is inevitable when governments provide funding for science. The public expects to get something back from the science they support——for example, better health, national security, jobs. This normal politicization does no harm and may even be good for science and society. But politicization taken to the extreme can be very harmful. In extreme politicization, governments or powerful advocacy groups use science and scientists who share or benefit from the politicization to drive science out of technical decisions and to promote a non-scientific agenda”
* The primary conflict during the early 20th century focused on the **distribution of wealth** among different social groups; After the Second World War, and particularly during the 1960s, the focus changed to the **distribution of power** in politics and economics. In more recent times, the major conflict has been about the **distribution and the tolerability of risks** for different social groups, regions and future generations.”(Renn, 2008)
* **Democratization of science as solution**: Researchers of post-normal science suggest that democratization of science is a way out – such ‘‘opening’’ or pluralization of the science allows other thoughts, observations, and data to make their way into the scientific processes to the betterment of scientific knowledge (Funtowicz & Ravetz, 1993; Carolan, 2006). Democratization of science means that scientific decisions are made not by scientists alone, but instead, they are reached in consultancy with citizens. As scientific issues concern all of us, they also should be discussed openly. Democratization of science first and most importantly refers to what is called “civic science”, which is broad term encompassing three levels of relationship between scientists and society: science representation (learning publics), public participation in science (dialogue with publics), and democratization of science (deliberation with publics) (Walker and Daniel, 2004).

**LIVE DISCUSSIONS**

Preliminary and suggested questions for the discussion (one or all of them can be covered during the LIVE discussion):

* Is there a way for more sustainable living in a contemporary risk society?
* How public scientific literacy may contribute and promote sustainability?
* What is situation of scientists and science in your country?
* Can you name more challenges and opportunities for science in contemporary world?
* How science communication can help to deal with these challenges and opportunities?

***TOPIC 2: Science communication in the 21st century. Main actors and changing communication processes.***

The second part of the module is focused on science communication, as a essential part of democratization of science. This part aims:

* to define **science communication** and science news reporting;
* to explain democratization of science and the **public participation model**;
* to highlight the importance and possible ways of bridging the gap between scientists, journalists and society.

Discussing the following statements and examples:

* **Democratization of science**: communicating science to involve and empower.
	+ **The public participation model**: society is realized as able to take part in common discourse together with scientists.
	+ **The contextual model**: in order to effectively communicate scientific knowledge, it is vital to evaluate dominant social and psychological factors, shaped by prior experiences, cultural context and personal conditions. Scientific knowledge is accepted and interpreted by society in the context of all these factors.
	+ **Deficit model**: society demonstrate low scientific illiteracy; do not have any competences and skills to interpret scientific knowledge and scientists, politicians or journalist try to fill in this gap with scientific information, however, information is send without any further expectations to be involved into longer discussions or dialogues.
* **The Process of Science Reporting**: For public participation model it is very important that all the actors of communication process are involved and engaged, most importantly, - scientists, public and journalists. While it can be promising to include society into the process of science, however, there are a number of pitfalls to reconsider. Let’s start with different aims scientists, society and journalists may have in the process of science communication. For instance, Scientists aim to bring their investigations to life, to present them and show, how they can improve daily life or solve some big problems, manage risks, and gain trust and acceptance from society, etc. But… communicating with lay audiences requires time, knowledge and other skills, therefor in many cases scientists themselves are not capable of doing it by themselves. Meanwhile public aim to get reliable information, necessary to make decisions and evaluate/manage risks, crisis. But… not everyone can understand scientific language and scientific process itself, therefore media is the main sources of science news for public. However, the way science is covered in media is often far from the message scientists want to communicate.
* **Public Understanding of science: Facts are not everything in the post-truth world**. The way people understand and evaluate science might be related to their political ideologies. Pew Research Center (2020) concluded that “Some public divides over science issues are aligned with partisanship [including climate change or vaccination], while many others are not. Trust in science is crucial to manage and fight contemporary global risks and crisis. Discussing following concepts:
	+ Scientific literacy
	+ Public understanding of science
	+ Public awareness of science
	+ Public participation and engagement
* **Scientists’ understanding of the public**: Serving to public good is in the very core of science, however, in many cases issues scientists try to solve are far from what public actually want scientists to do. But data indicate that 98% of scientists say they have some level of interaction with citizens at least from time to time, and 51% have at least some contact with reporters about research findings (Pew Research Center, 2015).
* **Science reporting – the role of media**:

**LIVE DISCUSSIONS**

Preliminary and suggested questions for the discussion (one or all of them can be covered during the LIVE discussion):

* What are traditional and new challenges related to the relations between journalists, scientists and society?
* How should they be addressed and solved?

***TOPIC 3: Guidelines for science reporting.***

Issues to cover: (1) **Spotting a science story worth covering**; (2) **Telling the story**; (3) **Science news for public good**: bridging the gap between journalists, scientists and public; (4) **Journalistic qualities and personal characteristics** in science reporting; (5) Covering science in the times of change and crisis.

* **Discovering a good science story** is the first important step towards successful science news reporting. However, it can be rather tricky and require more patience and investigation compared to other journalistic forms. While there are quite a large number of good sources to turn to for ideas and inspiration, including press releases from reliable institutions, blogs by world-leading scientists, podcasts, webinars, or social media platforms, amongst others, the essential point for a science journalist in the era of information overload is how to identify a truly good and important story to cover. Two major questions have to be tackled at this stage: How do I find the story (or, to be more precise, how does the story find me)? How do I know it is worth covering?
* **Telling the story – balanced and fair reporting**: “Too often science-policy stories create drama by citing experts arguing from two extremes without trying to find out whether there is a scientific middle ground” (Russell, 2010). While journalists, in general, have the goal of providing balanced perspectives and include all sides in their stories (Deuze, 2005; Clarke et al., 2015; Elliott, 2019), in science journalism, balanced reporting may cause misinformation. The biggest challenge comes when there is a real disagreement in the field. At this point, journalists must dig deeper and find out the true story behind this “disagreement”: Is it a result of irresponsible claims or is it an outcome of “reasonable differences in approaches to making important value judgements (which would often be helpful to report)” (Elliott, 2019)?
* **News for the public good: bridging the gap between journalists, scientists and the public**. “Effective science communications inform people about the benefits, risks, and other costs of their decisions, thereby allowing them to make sound choices” (Fishhoff, 2013). Nowadays, we expect science communication to go much further, aiming at engaging the public in common action, and in turn to work together against global risks and support a more sustainable future (Hansen, 2016). However, long-lasting tensions between scientists, journalists, and the public make this goal rather difficult to achieve. Different metaphors and terms have been used by scholars, experts, and those working in the field to describe the relationship between science and the public (or, more specifically, between science and the media) – “distance”, “gap”, “barrier”, “fence”, “oil and water”, and “creative tension” (Peters, 2013). Traditionally, scientists apprehend the media with suspicion and feel “uncomfortable with press coverage, worrying about being misquoted or having their research taken out of context” (Russell, 2010). From the first glance, it seems that scientists and journalists follow the same values – objectivity, accuracy, truth. But, in reality, they interpret these values differently – and this is the main source of mutual hostility.
* **Journalistic qualities and personal characteristics in science reporting**. The growth mindset is a “must” for a journalist. This requirement involves: constant learning, improving, acknowledging and learning from mistakes, being on top of the news in the field, following world-leading sources, easily adapting to technology-assisted ways of information gathering or verification, being flexible, being open, being adaptive, etc. However, there is one thing, which requires no flexibility – professional ethical principles and values. While so many things are changing around us, one important thing to keep stable is the professional ethics of journalism. Balanced and fair reporting, accuracy and precision, trust and respect – those are true and timeless values that help to make a distinction between true professional journalism and amateurism or treacherous attitudes.

**INDIVIDUAL ASSIGNMENT**

Writing a **popular science piece (science news story)** for mass media channels, following the provided guidelines and other recommendations discussed during the module. This task is dedicated to work on practical skills and abilities to apply study material while: (1) searching and collecting scientific information; (2) “translating” it into language understandable to lay audiences: (3) searching for best ways to combine scientific precision with journalistic norms - so that the article can attract the public attention and provide truthful information.

**Requirements for the assignment:**

* The article should be based on an actual scientific research (peer reviewed article, data-set, scientific report, interview with a scientist, etc.). The link to the original source should be provided at the end of your paper.
* The recommended length of the article is between 700 to 1000 words.
* All the guidelines should be addressed in the paper.

**Note:** instead of writing a paper, students also can tell their evidence-based stories in other forms, for instance, PPT slides, Posters, Video clips, audio recording, etc.