Open Science, Dark Knowledge: Science in an Age of Ignorance

In the era of Big Data, more and more data and information are accumulating each year. Yet, there is currently no parallel increase in actual public knowledge. The concept of Open Science is important, yet complementary approaches are urgently needed for narrowing the gap between potential (given the amount of data and information that are produced) and actual public knowledge – we term this gap Dark Knowledge. In this session, internationally leading experts will discuss how to cope with increasing ignorance and misinformation in decision-making processes.

Chair: Klement Tockner, President of the Austrian Science Fund (FWF), Vienna, Austria; Professor, Aquatic Ecology, Freie Universität Berlin

Coordination: Marie-Louise Skolud, Austrian Federal Ministry of Science, Research and Economy, Vienna

The session will consist of the following parts: (1) talks on the topic highlighting challenges and potential solutions, and (2) a plenary discussion focusing on potential solutions.

13.00-13.15 Welcome address (Federal Minister Harald Mahrer)
13.15-13.30 Introduction to the topic (Jonathan Jeschke, Freie Universität Berlin, co-organizer)
13.30-13.45 Linsey McGoey, University of Essex: What is the logic of ignorance and misinformation?
13.45-14.00 Matthias Groß, University of Jena: How can we overcome ignorance and misinformation?
14.00-14.30 Questions & Discussion
Coffee break
15.00-15.15 Roger Pielke, University of Colorado: What is the role of science in today’s societies?
15.15-15.30 Victoria Stodden, University of Illinois at Urbana-Champaign: What are the opportunities and limits of Open Science for tackling ignorance and misinformation?
15.30-15.45 Katy Börner, Indiana University: "What are the opportunities and limits of data visualization for rendering (mis-)information into actionable insights?"
15.45-16.15 Questions & Discussion
16.15-16.50 Plenary discussion, moderated by Klement Tockner (Austrian Science Fund) and Jonathan Jeschke (Freie Universität Berlin)
16.50-17.00 Final summary statement by Robert-Jan Smits (European Commission)
Abstract

1. Introduction to the Topics

Knowledge in the Dark: Scientific Challenges and Ways Forward

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In the current era of Big Data, data and information are rapidly accumulating, and many of these are available instantly and almost everywhere. Yet, this enormous increase in information is not paralleled by a similar increase in actual evidence-based knowledge in today’s societies. The present era, often described as the age of information, is also an age of ignorance. Reasons for public ignorance include: (1) the production of biased information and (2) lack of research on key topics, both due to sociopolitical or financial interests; (3) specialized jargon and complex disciplinary knowledge that is inaccessible to the public; and (4) loss of previous knowledge. By globally analyzing budgets for research and development by the industry and governments, the latter comprising military and civil research, we show that only a fraction of the budget is invested with the principal intention to increase public knowledge. Yet even in the academic realm, several factors lead to a gap between potential and actual public knowledge. We term this gap knowledge in the dark – or short: dark knowledge – and provide an overview of the reasons for dark knowledge in academia. Finally, we suggest ways forward, for example developing advanced tools for research synthesis, establishing an international court of arbitration for research, and launching novel training courses for the next generation of researchers.
Abstract

2. What is the logic of ignorance and misinformation?

Understanding the Political Economy of Ignorance and Misinformation

The aim of my talk is to add historical and social context to current perceptions of the growth of public ignorance in liberal democracies. My main goal is to suggest that we need greater attention to the political economy of public ignorance, something that entails a closer study of the political and financial stakeholders who play a role in increasing public barriers to scientific information.

I suggest that it may be useful to adopt a ‘trinity’ approach to understand the role and power of different actors, something that would elevate the importance of non-state actors such as philanthropic foundations as key subjects of critical inquiry. To date, political debate has often centred on a dualism between the state and the market. This dualism risks obfuscating the fact that state actors are key providers of commercial funding, and are therefore powerful market actors themselves. It also obscures the increasingly influential role that corporate actors and private individuals play in policy-setting at the governmental level, both through lobbying for policies that advance corporate interests, and through acting as powerful symbols of progress and compassion through humanitarian actions.

I suggest that in order to understand limits to scientific knowledge and dissemination today, we need to see three key sets of power-holders as distinctive but linked entities that play a strong role in limiting public access to information: state actors; for-profit institutions; and private philanthropic foundations. The first two actors – governments and corporations – have received ample attention from social scientists. Until recently, philanthropic foundations had received less scrutiny, a trend that is now changing. I canvass growing literature on the role of foundations in increasing public access to scientific information, on the one hand, and derailing efforts to improve transparency on the other hand. In conclusion, I detail why a non-partisan approach is essential to challenging and limiting the anti-democratic influence of private philanthropic funding on US and European electoral politics.
Abstract

3. How we can overcome ignorance and misinformation?

Can Ignorance be Useful?

Not knowing or ignorance has traditionally been rendered a deficient state of being. Paradoxically however, the unknown is favored in science since scientists use well-defined ignorance to direct their research. With each problem solved unsolved problems and thus new horizons regarding the unknown become visible. In times of post truth politics and alleged misinformation it seems extremely important to take the view to analyze the unknown more neutrally in order to better understand why and when ignorance and lack of knowledge in the media, in everyday life or in science and engineering may have certain effects towards decision making and construction of “facts” (in the sense of accepted knowledge). In my opening statement I will discuss the tension between the usefulness of ignorance on the one hand and the danger of possible misuse by actors with unsavory motives on the other hand. To foster the discussion I will present some preliminary points to “registering” nonknowledge (e.g., in interview sequences and media outlets) and raising awareness of its normality in order to communicate ignorance to a concerned public.
(Speaker 4: Roger Pielke, Jr., Sports Governance Center, Department of Athletics, University of Colorado, Boulder)

Abstract

4. What is the role of science in today's societies?

There exists an inherent tension between expertise and democracy. On the one hand, governance in the 21st century would be impossible without public officials with deep expertise making judgments and decisions on subjects that few understand. On the other hand, the many flavors of democratic governance have in common a belief that those who are governed have a right to influence public policy making, including (but not limited to) via elections. But most citizens are not experts in matters of governance. The public is, inevitably, largely ignorant of the many issues found in 21st century policy making. Does this make democracy impossible? Or if it is possible, lead inevitably towards a form of populism that rejects expertise in favor of the sort of politics that has delivered Brexit in the EU and President Donald Trump in the US?

I will argue that while the tensions between expertise and democracy are indeed very real, we have choices to make in democratic systems that can lead to better or worse outcomes in policy and in politics. More effective democratic practices must begin with an appreciation that profound ignorance is the normal condition for all of us, even us experts. No one knows enough to govern the modern state, and even those of use with expertise in one or a few subjects have no more knowledge on most things than most any member of the public. For governance to work experts must be able to make decisions where they apply their unique expertise, but at the same time, those decisions must be viewed to be legitimate in the eyes of those affected by those decisions, the public.

Resolving the inevitable tension between expertise and democracy lies not in the elimination of public ignorance – an impossibility – but instead, in creating the conditions under which expertise is viewed to be legitimate in the eyes of those who hold the ultimate power in democratic systems, the public. As US political scientist EE Schattschneider wrote in 1960, “Democracy is a competitive political system in which competing leaders and organizations define the alternatives of public policy in such a way that the public can participate in the decision-making process.” Experts, and elites more generally, have considerable ability to
create conditions for the strengthening of democratic legitimacy. Similarly, their actions can also weaken democratic legitimacy. In my remarks, I will argue that the fundamental challenge of our time is not in fact ignorance. Rather, the fundamental challenge facing democratic governance in liberal democracies is one of the legitimacy of expertise in the eyes of the public.
Abstract

5. What are the opportunities and limits of Open Science for tackling ignorance and misinformation?

Open Science presents unprecedented opportunities for the communication of scientific knowledge, and for citizen participation in its creation. In this talk I will outline these opportunities and the potential they hold for education and discovery. I will also discuss the challenges to realizing this vision and present potential paths forward.
Abstract

6. What are the opportunities and limits of data visualization for rendering (mis-)information into actionable insights?

How to NOT Lie with Maps

In the information age, the ability to read and make data visualizations is as important as the ability to read and write. This talk explains and exemplifies the power of data visualizations not only to help locate us in physical space but also to help us understand the extent and structure of our collective knowledge, to identify bursts of activity, pathways of ideas, and borders that beg to be crossed. It introduces a theoretical visualization framework meant to empower anyone to systematically render data into insights together with tools that support temporal, geospatial, topical, and network analyses and visualizations. Materials from the Information Visualization MOOC (http://ivmooc.cns.iu.edu) and nanoscience and technology maps from the Places & Spaces: Mapping Science exhibit (http://scimaps.org) will be used to illustrate key concepts and to inspire participants to visualize their very own data.