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AKADEMIE VAN WETENSCHAPPEN

‘MAKE SURE THAT SCIENCE CONTINUES TO HAVE A SAY’

Report on the Science 2.0 meeting, 23 October 2014
by Arno van ‘t Hoog

Science is ‘in transition’, driven by globalisation and the growing power of ICT. That is the provisional diagnosis of the European Commission in the ‘Science 2.0’: Science in Transition consultation. Opinions were divided on this matter during a meeting at the Trippenhuis Building. What precisely *is* Science 2.0?

The Science 2.0 Background Document describes the underlying trends. ‘Every decade now produces as many new scientists as have lived before,’ the Commission observes. It quotes a 2013 World Bank Report stating that the number of college graduates in China could swell by 200 million over the next two decades – more than the entire labour force of the United States.

The army of scientists is engaging in more and more research and producing a growing body of research data and scientific publications. Science has become more data-intensive, with scientific data output increasing at an annual rate of 30%. More than half of scientists use datasets that exceed 1 Gigabyte in size.

Not only is the research community growing, notes the Commission, but businesses, civil society organisations and the public are all becoming more involved in scientific endeavour. As the end users of scientific knowledge, they are exercising a growing influence on the agenda and the direction of research. At times, they do that literally, with philanthropic organisations (the Commission mentions the Bill & Melinda Gates Foundation) and organisations set up to support good causes (such as Alpe d'HuZes, mentioned during the 23 October meeting) making major amounts in funding available for specific projects.

ICT and the emerging scientific powerhouses in Asia are turning science into a more open sector that can be accessed worldwide. Mendeley, Academia.edu and other online platforms are intensifying communication and interaction between millions of scientists. That in turn is stimulating scientific output.

EU policy

No one will deny that science is in transition. But whether the transition is so fundamental and revolutionary that it requires EU policy is open to debate, says Denise Heiligers, assistant to the Commission’s Director-General Research & Innovation.

Heiligers believes that current trends in science offer new opportunities, such as more transparency, more collaboration, and, in the longer term, greater efficiency – in short, more science for every euro invested. But at the same time, there are new challenges, including the changing roles that all sorts of actors play in the research cycle and the way in which we assess scientific performance, quality and impact.

Amsterdam, 23 October 2014

The question is whether we are underrating or overrating present-day trends, says Heiligers. 'That's the reason for the current consultation – to see whether our perceptions are shared by the people who actually work in science. Have others observed a systemic change in the modus operandi of doing research, and do they too recognise the opportunities and challenges involved? As policymakers we don't want to miss the boat, but we don't want to jump the gun either.'

Consultation

A total of 498 individuals contributed to the Commission's open online consultation. Almost a third of them represented academic and research organisations across Europe. The picture that emerges generally confirms the Commission's perceptions. Jean-Claude Burgelman, head of the Science Policy, Foresight and Data division at DG Research & Innovation, outlined the results.

The contributors saw digital research and communication technologies as the most important driver of Science 2.0. They also believe that reliability and efficiency can be improved and innovation accelerated. In their view, the barriers to Science 2.0 are limited awareness of the underlying trends, concerns about quality assurance, and uncertain benefits for research. Finally, the majority of contributors believe that policymakers can stimulate Science 2.0 most by supporting open access to publications and open access to research data.

Open science

The Dutch State Secretary for Science, Sander Dekker, addressed the attendees in a video message. Like the Commission, he focused mainly on the impact of digitisation on open science. 'Science is digitising, becoming more data-driven, more relevant to society – and that means that it is breaking down barriers. ICT makes real-time collaboration, for example with businesses, simpler. It allows a researcher in Amsterdam to work with an R&D department in Tokyo. Another example are the interlinked biobank databases… They may be helping to accelerate the development of new medicines.'

'Before, researchers needed subscriptions to journals and index files to find articles. Now they can quickly share information with one another,' says Dekker. 'If it were up to me, there would be immediate open access to publications so that teachers, doctors and small businesses could benefit from the knowledge that you are generating. They have a right to that. The knowledge that you generate with public funds should be accessible to the public, in my opinion. So don't only think about how to break down barriers between yourself and your colleagues, but also about how you yourself can take your science into the world. That's the only way to achieve really open science.'

Clear definition

For Academy President Hans Clevers, the debate about what Science 2.0 actually is – and thus the point of the afternoon programme – is far from over. To begin with, the terminology is not at all clear. 'I think that originally, Science 2.0 was much more ICT-focused,' says Clevers, 'but that issues from Science in Transition have been added, as the title of the Consultation indicates. I mean issues like research quality, integrity, and assessment criteria for careers in science. Another major issue is how to set the agenda for research that is paid for by society. As a scientist, I would say: start by making sure that your research questions are clear and that you have a clear set of definitions. Because I don't see those anywhere yet. What is Science 2.0?'

The split that Clevers identified, between the influence of digitisation on science and the discussion about the science system, returned in the eight working groups that began their discussions later in the afternoon. Each working group was asked to come up with three recommendations for the Commission about Science 2.0. What should the Commission's policy focus on? Were there issues that merit extra attention, or issues that had not yet been addressed?

Parallel discussions

The plenary report on the eight working groups' recommendations illustrated Clevers' point that there are, in fact, two parallel discussions that overlap in Science 2.0. On the one hand, there is the rapid digitisation and globalisation of science and the question of whether EU policy is necessary to support it. On the other, there is the impact of digitisation on the science system, including peer review, quality assurance, integrity, the careers of scientists, and how social issues drive the research agenda.

When asked what the Commission can do to facilitate the ICT side of Science 2.0, the working groups' unanimous recommendation was 'support open access as much as possible'. Scientific publications should be accessible to everyone. That requires a better e-infrastructure and, above all, consultation with publishers, which represent a key power factor in the reform of scientific publication traditions. At the same time, the quality of peer reviewing must be guaranteed. Many of those present felt that the peer review process had to be organised more transparently, including with a view to how reviewers are recognised for their efforts.

Digitisation and ICT

A brief selection of the recommendations for the Commission concerning digitisation and ICT policy:

- Facilitate experiments and sharing of best practices with regard to digital innovations in research that generate added value.
- Make the peer review process more transparent: during the process, earlier versions of an article should also be visible online, as well as information on who contributed what to the research and the article. That would make the discussion about quality easier to follow.
- Involve 'digital natives' from within and outside the university. Get junior scientists to engage more, because young PhD candidates generally know more about digital innovations than supervisors or administrators.
- See that Europe plays a leading role in open access. Because 30% of all publications worldwide originate in Europe, the EU can get the rest of the world to fall in line with its ideas.
- Support an outstanding digital infrastructure.

Impact of digitisation

When asked what the Commission can do about the impact of digitisation on scientific traditions, quality, integrity and career progress, the working groups' recommendation was to leave that to the scientific community itself.

As one of the working groups said: 'That is the domain of science itself – and it should stay that way. What we have heard from the EU today seems like a blueprint for science and scientific endeavour. That does not fit in with the evolutionary, organic, self-managing nature of science.'

Below are selected recommendations about scientific endeavour – i.e. where science itself must take the lead, with or without the Commission's support:

- Products and services other than publications should be given more recognition in assessments and evaluations. Various career paths are possible; do not measure everyone by the same career yardstick. There is no 'one size fits all' when it comes to talent.
- Let research groups themselves say which aspects they wish to be assessed on. That would also be in line with the new Standard Evaluation Protocol.
- Pay more attention to young peoples' career opportunities and to career diversity; a biosketch (as used in the USA) can reveal that diversity.

One working group observed a blind spot in the analysis of Science 2.0, i.e. education and how it interacts with research, society and career. As the working group put it: 'Education should not be left out; it really must be part of Science 2.0. After all, education is the best means for connecting and communicating with

society. Education and research constitute a single unit. Education should also be given greater recognition in scientific careers.'

To be continued

The Commission's representatives returned to Brussels with a broad range of responses and recommendations from the Netherlands. All responses, including those put forward during similar meetings in other European countries, will be reviewed in the months ahead. The Commission expects to announce any policy initiatives by the summer of 2015. The Netherlands had a clear message for the Commission: focus on open access and on creating a large-scale research e-infrastructure and leave the other aspects to science itself.

In Hans Clevers' words: 'We are now seeing that Science 2.0 has support at a higher institutional level. The risk is that the agenda will be hijacked and that it will be the policymakers at representative organisations who fill in questionnaires. My warning is: make sure that science and scientists continue to have a say.'

References

- EU's Science 2.0 background document
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