

Concluding remarks

Dorit Raines

Let me begin my concluding remarks by thanking:

First, I would like to thank the speakers who illuminated us with their thoughts and ideas: our key-speaker Jean-Claude Burgelman, and then Achille Giacometti, Wouter Haak and Paolo Budroni. The Panel wonderfully chaired by Ignasi Labastida, with the participation of Gerhard Budin, Donatella Castelli, Paola Galimberti, Wouter Haak and Enzo Valente. The chairs of the round tables: Paolo Budroni, Helena Cousijn and Paola Gargiulo, and the rapporteurs: Raman Ganguly, Emanuela Molinaro, Federica Rosetta and Barbara Sánchez Solís have all defied time and space in order to get you work and present the conclusions so rapidly that they may be considered for a Guinness record prize. Many thanks for the three organizing institutions: E-Infrastructures Austria, Elsevier and the Library System of the University of Ca' Foscari. A real special thanks goes for Marisol Occioni who has worked quite hard in organizing the event, as well as for the “help desk” girls: Barbara Bolgan, Renata Falasco, Claudia Gianella, and Irene Zanolco.

Last but not least, I would like to thank all the participants for their involvement, ideas, suggestions and company. I hope we will meet again in other occasions in order to continue the discussion.

So thank you all. And now to my concluding remarks.

Science in transition. Today we are on the verge of a revolution, mostly cultural, or if you want a scientific-cultural one. Thomas Kuhn has already observed that the usual scientific practice includes law, theory, application, and instrumentation that together provide models from which spring particular coherent traditions of scientific research. Technology is enabling us today to rethink our scientific products and reformulate practices of information exchange within scientific communities. What scholars are asked at present is not only to present their “final” analysis and conclusions (fixed data), but also to dynamically update them. Furthermore, both the scientific community and various stakeholders start reevaluating the key role of processed research data publication. Slowly (or rapidly, depending on one's viewpoint) we are moving toward a new era where the chain of knowledge production and dissemination will turn into a multi-layered array (metaphorically speaking, not in the sense of Computer Sciences) of scientific hubs.

These hubs will be made of different stakeholders: scholars, scientific-domain users, data scientists, academic editors, repository custodians, each with specific skill sets: research, publication, dissemination, dataset updating, long-term conservation management in sustainable repositories.

Libraries, archives with their records, books and manuscripts will continue to function for the mass of material that is part of our history and identity. But the new world of the Open Science Cloud will be made of repositories and documents, of stewardship and custodianship, of metadata and content data. And this is the reason why we are convened here today, that is to discuss what the European Science Cloud first report defined as an important aspect “presently lacking”, i.e. “professional data management and long-term data stewardship”.

Three main themes suggested for discussion in the Round Tables were: policies of data stewardship; ownership and re-usability of research data; and, data custodianship. I think that first we have to establish the correct pipeline that will help us make some order: first comes the research idea or project, which in turn needs financing (decision on authorship **and/or** updating **and/or** storage), and a decision on the research product type, then pursues a publication (peer review?), which needs some preliminary decisions (which may have to do with financing): access policy + update policy (obligatory, required, optional) + storage policy (storage length and institution), and finally storage financing and provider. In short, we have to set the details of the Data Management plan.

What comes out are three different topics that have to be evaluated: the stakeholders and their role, the type of scientific product we are talking about and the storage policy. We have already noticed that various types of stakeholders participate in this process: the researcher, the financing body (public or private), the editor, the data steward and the data custodian. The system should be rather resilient as to the role of each in the pipeline described above, but it has to set some guidelines in order to ensure that the data should be available for communities for the specified length of time as set by the stakeholder that owns the authorship. The system should also be sensitive to different practices in different disciplines (scientific vs. humanities for example) and the probability that scientific publications will be massively and rather quickly and constantly updated whereas the humanities field will have another pace. In fact, we need governance, but we should not expect it to resolve all our problems. Perhaps brokerage rather than governance can constitute a plausible solution.

Engineering knowledge is a new but I think a serious profession and in the coming years we will hear a lot said and developed about ways of smart data navigation. This is indeed exciting for every researcher, but dangers also lurk behind this brave new world. New ways of search will be

established, mostly algorithm-driven in the Big Data era. Will the possibility to access to more data than one could have possibly wished for ten years ago bring about innovation?

Before I conclude I would like to share with you a thought about the origin of innovation in research. In the 1980s and the 1990s some neuroscientists from the University of Parma decided to measure the neuron's response to certain movements of macaque monkeys. They placed electrodes in the ventral premotor cortex of the monkey to study neurons specialized for the control of hand and mouth actions. During each experiment, the researchers allowed the monkey to reach for pieces of food. One day the neuroscientist Giacomo Rizzolatti was eating a banana when he noticed that some of the monkey's neurons responded to the observation of a man (himself) eating food and not only to the monkey's activity in reaching for the food. This led to the discovery of the mirror neuron, the neuron "mirrors" the behavior of the other, as though the observer were itself acting. This meant that the animal was capable of learning new skills by imitation.

Innovative ideas may of course come by having access to all information, but sometime, serendipity is equally important. Discovering randomly is not the only explanation to an innovation, what is important is that the researcher is able to "see bridges where others saw holes" and connect events creatively, based on the perception of a significant link. I was wondering whether the European Open Science Cloud may be as resilient as leave some room for serendipity.

Thank you!