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Organización
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منظمة الأمم المتحدة
للتربية والعلم والثقافة

联合国教育、
科学及文化组织



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on the Information Society
Turning targets into action

Report of the Rapporteur

High-level Meeting

World Summit on the Information Society Review Meeting (WSIS+10)

Using e-Science to Strengthen the Interface between Science, Policy and Society

UNESCO Headquarters Paris
Room II

26 February 2013
9:00-12:30

Report on the meeting of the Technical Working Group (TWG)

The Technical Working Group (TWG) was chaired by Prof Muki Haklay of the University College London UK, and preceded the High-level Roundtable on using e-science and technologies to support decision making in science policy. Prof. Haklay opened with a brief overview and basic principles of citizen science, in particular the manner in which the internet has changed citizen science, increasing citizen participation drastically, not only as data collectors, but as active participants in the full scientific process. The discussions of the Technical Working Group focused on how to increase inclusiveness in e-science and technologies in particular for local and rural communities, youth and women in the developing world.

The panel members of the TWG presented their work in e-science and e-citizen science by establishing means of disseminating data and information between scientists and communities. They argued that such projects need to include not only web-based platforms, but also traditional ICTs as a way of engaging hard-to-reach communities and segments of societies with science. For instance, community radio, community meetings and mobile phones are important and useful tools for disseminating knowledge to and from web-based platforms. Having community hubs (or centres) in place whose role is to facilitate such further dissemination is also very important. In this regard, the main proposal of creating a web-based platform to enlarge the interface between science, policy and society must be supported by strategies for information and knowledge exchange with those who do not have ready access to the internet. Specific examples include:

1. Barbara Birungi (Uganda) highlighted the importance of bridging the technical community and laypeople. She used an example an-application developed by her organization to assist farmers in accessing information about agricultural products, to ensure that they are purchasing legitimate products. Although they have also developed apps for women, particularly related to pre-natal care, she also emphasized the particular challenges facing women in Uganda, who face high

illiteracy and low access to mobile phones, lack of reliable electricity and poor network infrastructure. Ms Birungi also expressed the importance of ensuring wider accessibility of ICTs—they must be easily understandable and usable, including having local content in appropriate languages.

2. Emanuel Feruzi (Tanzania) is developing a web-based platform which focusses on the needs of the end-users. An example is a platform which connects farmers to the market to better identify where their produce is most in demand. He argued that web platforms serve the important function of making more accessible the diverse and multiple data-sets that already exist. He also indicated the importance of making ICT tools and phone applications available in local languages to improve the involvement of society;

3. Rohit Pothukuchi (India) highlighted the problem of the gap between policy-makers and society. He presented the Verdentum Global Communication Initiative which seeks to use new ICTs and web-based platforms to create links between policy-makers and global communities of ICT and science engaged youth. By creating a platform whereby school groups can study, discuss and act upon key issues as identified by policy-makers, his platform creates innovative learning environments and generates creative solutions to local development problems at the same time. His platform is currently operating in over 100 countries world-wide;

4. Cindy Regalado (Mexico/UK) presented the Extreme Citizen Science (ExCiteS) project, based at University College, London. She advocated for a new hands-on concept of science which actively engages with non-scientist citizens to work towards a new concept of learning and creative problem-solving in society. This approach, which involves the non-scientist volunteer in the full scientific process links knowledge to action in “publicly initiated scientific research”, which is community owned, community oriented and developed. She demonstrated the potential of this approach with the example of a project in London with immigrant communities. A “Touch/learn/play” community learning centre in London initially taught children about LEDs and other technological elements. The children soon involved their parents in the learning, serving as translators and intermediaries. The parents soon began their own projects which solved problems they identified in creative ways.

Interventions of Discussants

5. Professor Susana Finquelievich (Argentina) discussed how the findings from her UNESCO commissioned report “Emerging Trends in E-Science: Citizen science, mobile technologies and ICTs” relate to the issues raised during the session. She particularly focused on the important role of mobile technologies in opening up citizen science to women, developing countries and rural and marginalized communities. She stressed the needs for the promotion of e-citizen science projects, particularly through the development of national policies in developing countries which create a favourable environment for making science more inclusive.

6. Albert Yeboah Obeng (Ghana) stressed the increasing role that ICTs and applications play in the daily lives of people around the world. He advocated for the improved access to more affordable, user friendly and culturally adapted ICTS that complement local industries. He identified a common thread of the session as relating to citizens and citizen-science, in particular, encouraging a more active role for non-scientists in the scientific process. Policy-makers can support the involvement of citizens in the scientific process and governments can provide

financial support to post-graduates in developing countries, can enhance knowledge transfer and ICT use. They can also promote partnerships. He also called for meaningful follow-up to meetings such as this one.

7. Francoise Yoda (Burkina Faso) shared her thoughts her experience with her organization on the role community radio play to improve exchange of information between society, policy and science. Ms Yoda pointed out that it is important to recognize and enhance existing local knowledge and technology that currently address local needs. She explained that Community Radios can support web-based platforms in areas where internet connection or electricity is lacking. She also argued that local communities produce information and data relevant for science, which can then be fed back to communities. She highlighted, for example, the important role that community centres play in offering services to rural areas. A major challenge, however, is a lack of access to broadband and the cost and insecurity of software. She pointed out that many community cybercentres are under cyber-attack and some are shutting down. Finally, Ms Yoda renewed the call for a better communication between policy-makers and communities in order to improve inclusiveness and mutual participation.

RECOMMENDATIONS

Regarding the Citizen science:

- i. Facilitate the greater involvement of citizens in the scientific process
- ii. Design and promote policies and strategies aimed at the development of e-Citizen Science, especially co-creative e-Citizen Science, within national and international forums related to the Knowledge Society
- iii. Include eCS in their E-Science Fora, with particular focus on science co-creation.
- iv. Implement cooperation programs between governments to generate and implement the necessary policies related to E-Citizen Science.
- v. Create international co-operation programs between public organizations (NGOs, universities, scientific committees, etc.) that can perform eCS projects.
- vi. Through geographic and economic regions such as the European Union, Mercosur, Unasur and others, identify priority areas to use eCS for regional integration, and to implement appropriate regional scientific agencies and their funding for eCS programmes

Regarding the proposed web-based platform:

- i. The web-based platform being proposed should use several applications (internet, mobile phone, radio) to allow citizens to get involved according to the possibilities available to them in their community and appropriate consideration to intermediaries that allow citizens without access to the internet to benefit from it; To facilitate this, citizens could be identified and trained citizens to use and develop tools. After which, the platform could include actors as the central state, local communities, scientists, citizens and facilitate the sharing of knowledge on science related issues.

- ii. It should facilitate the inclusion and participation of the Youth and Elderly through social networks and other ICT tools through youth training on the use of Web 2.0 tools another option that could be explored where possible is the community multimedia centers (this will allow the strengthening of existing mechanisms).
- iii. It should also be available in local languages and official UN languages
- iv. The platform should have a user-friendly and interactive interface with integrated multiple resources including audio, video, text, photos, etc.

Report on the meeting of the High-level Roundtable

Introduction

Gretchen Kalonji, Assistant Director General, Natural Science Sector of UNESCO recalled the role of UNESCO in promoting e-Science for sustainable development and provided several examples of programmes and activities carried out by the Organization to this end. She welcomed the panelists attending the high-level roundtable, which was expected to produce recommendations on how e-Science can best enhance the dialogue and mutually supportive roles of science and policy, for the benefit of society.

Presentations of roundtable panelists

- 1. H.E. Mr Jacques Kabale, Ambassador Extraordinary and Plenipotentiary of the Republic of Rwanda to France**, representing H.E. Dr. Vincent Biruta, Minister of Education of Rwanda, informed participants that ICTs are recognized as a priority in Rwanda. This includes both the programme aimed at providing every child with a laptop; using ICTs in education programmes; and, at the University level, rely on ICTs to conduct research and develop related applications. Still, challenges do exist. One of the main challenges is related to access to ICTs in general and e-Science in particular. In this regard, Rwanda welcomes the initiative by UNESCO to develop a web-based platform to facilitate e-Science in support of policy and for the benefit of science. This platform will allow the open and free access to scientific knowledge; and allow countries to optimize their capacities to promote the Internet to pursue their development and learning objectives.
- 2. H.E Ita Okon Bassey Ewa, Minister of Science and Technology of the Federal republic of Nigeria**, stated that operationalizing e-Science is a necessity and is urgently needed. The Internet usage statistics in Nigeria, coupled with demographics statistics in terms of population estimate and country area coverage, indicate that access to ICTs remains a challenge to be tackled and met. These technologies can greatly assist in the development of applications based on remote sensing and other observations and can be used in many sectors including agriculture. He called for a holistic approach to mainstreaming ICTs into science and policy and, in the case of the latter, referred to the need to develop a tailored policy on ICTs and e-Science. Applications of e-Science also encompass health, as exemplified by the Telemedicine Project, which has greatly benefited communities in the rural areas in Nigeria. In the education and research area, ICTs can assist with e-libraries, open access journals, collaborations around specific projects and online courses, such as those implemented by the National Open University of Nigeria. E-Science also offers prospects for innovation and intellectual property access. Current challenges include access to the Internet (infrastructures, cost, low awareness, the needed cultural change (reluctance to use the Internet) and related interventions related to energy and the roles of competent governmental institutions. Nigeria supports UNESCO's initiative on e-Science, including future efforts to develop an Internet-based platform for e-Science.
- 3. Prof. José Mariano Gago, Former Minister of Science, Technology and Higher Education of Portugal**, referred to the fact that the expansion of science during, especially, the last decade would not have been possible without e-Science, There are two main dimensions to e-Science: the Internet, including access to wikis; and e-Science developed to assist specific disciplines, as exemplified by computer

simulations, remote control, remote data acquisition systems, online access to data, and dedicated e-learning and e-conferencing. All these tools and application areas do require policies. Prof. Gago provided examples of how e-Science has been used in Europe to validate scientific information, and open access represents a clear example of such policies that are needed. The impact of e-tools in science policy can be referred to 'internal' tools, which have changed the way in which institutions operate in terms of access to data which are needed to develop policy; but also to those tools allowing the active science community to liaise with the research funding community through developing requests, project networking and evaluation. An external impact of e-Science is assisting different stakeholders to benefit from the findings of science and it also facilitates collaboration in science through the process of citizen science. Moreover, e-Science also assists in meeting the challenge of bridging the local with the international levels in the area of science policy. Many societal opportunities came out of the use of e-Science tools, including in relation to dealing with natural disasters; citizen choices; and science-based evaluation of issues at the heart of society's priorities and preoccupations. Prof. Gago recommended that different areas of application of e-Science require different policy interventions.

4. The intervention of **Prof. Sir Robert Watson**, focused on the contribution of e-Science to enhancing the effectiveness of the science-policy interface. This was presented in the context of the processes related to the post-2015 development agenda, MDGs and the Rio+20 Conference outcomes, which also refer to the need to look beyond the MDGs, and the newly-formed Scientific Advisory Board to the UN Secretary-General and the UN system. Sir Watson pointed out that good science is essential to creating evidence based policy, as exemplified by the Future Earth programme. He also indicated that it is important to assess scientific knowledge by the way it influences policy processes and outcomes. He also pointed out the importance of recognizing and using relevant indigenous and local knowledge in these processes. Knowledge will need to be increasingly co-designed, and scientific assessments, while not being policy prescriptive, ultimately will need to support policy. Poverty eradication, the biodiversity crisis and climate change call for further knowledge to be produced and assessed. The host of assessments carried out so far indicate that we need a web-based multidisciplinary knowledge system that critically reviews and synthesizes new knowledge in as a real time as possible. This platform will directly and significantly strengthen the science-policy interface. The system should be tailored so as reflect the dynamics of the science-policy interface at the national, sub-regional and regional and global levels. The web-based platform will also assist in linking the current discussions on international targets such as the post-2015 MDGs and the SDGs. It will assist fill the current disconnect between academic and policymakers. What are the drivers of change (cultural, STI) in addition to the natural drivers? How does their interaction affect human well-being, social inclusion and participation? How do we transform society today ultimately? A UN system e-Science initiative, led by UNESCO, would enormously assist in this respect. Hosting it in an intergovernmental context would assist issues such as water security, factors affecting poverty, human security and others more effectively than if this platform were to be hosted by an independent academic institution. The platform must be demand-, not supply-driven, and needs to benefit from political demand and a clear authorizing mechanism. This initiative would be of direct interest to enterprises such as Google and Microsoft, which would also assist in ensuring the necessary technological support, and contribute to the funding, required to make this platform operational.

Interventions of discussants

5. Mr José Cotta, Chief of Digital Science Unit, DG CNECT, European Commission presented the EU's vision for digital science, which sees the interaction between new research and methods, open access to research, collaboration in research, and engagement of society. Together, the synergistic interactions between these 'building blocks' will promote the mutually-supportive interaction between science, innovation and policy. Finally, harnessing the true potential of digital science anticipates the transformational capacity of science within science itself as well as in terms of the various applications of society for the benefit of society.

6. Ambassador Tibor Tóth, the Executive Secretary of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) presented CTBTO's experience in setting-up and running an international monitoring system for radionuclide observations, seismic activity and hydro-acoustics, which relies heavily on ICTs. Intergovernmental organizations can assist greatly in 'unlocking' the potential of international scientific cooperation, including from the perspective of the need to train new experts on a continuous basis. The change required in society calls for knowledge generation but also for concrete action, and ICTs can assist in the sharing of concrete actions pursued by intergovernmental organizations around the world.

7. Dr. Zdenek Zdrahal, Senior Research Fellow, The Knowledge Media Institute, The Open University (UK), presented the Open University's experience on connecting repositories of knowledge particularly from the underlying philosophy of promoting open access. He pointed out that if research is funded via public funding, its results should be available through open access. Open access information can be used for accessing scientific articles and for accessing data generated through research. Interlinking repositories entails the challenge of working with different languages, and recent developments in semantic tools can greatly assist in this respect. The UNESCO CLIC project represents an example of such an approach.

Open discussion

The discussion included interventions from the Vice Minister for Research of Iran, who stressed the role of ICTs in supporting decision-making. In his intervention the Vice Minister highlighted the role of ICTs in education. It was pointed out that there is an issue related to the scientific contents of educational programmes, which should be looked at in the broader context of the right of ensuring education for all. A question was raised concerning the involvement of youth in the e-learning objectives. In Nigeria, the involvement of youth is being pursued through community centres, which promote access to the Internet. It was stressed from the floor that the new generation will have a central role in future developments related to the contribution of e-Science to policy and society. Another question was raised concerning the free dissemination of data, which currently experiences barriers in certain countries and contexts. Sir Watson stressed that assessment of knowledge can lead to the production of 'inconvenient truth'. Hence there is a need to maintain a fine line between getting the facts on the table, interpreting the facts and advocating for change.

RECOMMENDATIONS

The session noted that:

- i. Operationalizing e-Science is a necessity and urgently needed. ICTs are recognized as a priority in many countries and further recognition to this end should be promoted.
- ii. E-Science can act as an important tool in the development of applications in sectors critical to society such as natural disasters, agriculture, water security, health, poverty, education, research and innovation and intellectual property. Many societal opportunities have arisen as a result of the application of e-Science tools, such as informing citizen choices and facilitating science-based evaluation of issues at the heart of society's priorities and preoccupations.
- iii. Harnessing the true potential of digital science anticipates the transformational capacity of science within science itself as well as in terms of the various applications of society for the benefit of society.
- iv. Access to ICTs remains a challenge to be tackled and met. These include access to the Internet, the needed cultural change to promote the use of the Internet and the need to develop tailored policies to support e-Science.
- v. There is a clear enabling environment for investing on the contribution of e-Science to enhancing the effectiveness of the science-policy interface. This is provided inter alia by the post-2015 MDGs and SDGs processes, the Rio+20 Conference outcomes and the newly-formed Scientific Advisory Board to the UN Secretary-General and the UN system. The host of scientific assessments carried out so far in relation to climate change, biodiversity and ecosystem services and agriculture indicate that we need a web-based multidisciplinary knowledge system that critically reviews and synthesizes new knowledge in as a real time as possible.
- vi. The session strongly supported the initiative by UNESCO to develop a web-based platform to facilitate e-Science in support of policy and for the benefit of science and society. This platform will allow the open and free access to scientific knowledge; and allow countries to optimize their capacities to promote the Internet to pursue their development and learning objectives.
- vii. The session recommended the development and operationalization of the proposed e-Science platform by UNESCO. The platform should focus on significantly strengthening the science-policy interface. It should be designed and tailored to reflect the dynamics of the science-policy interface at the national, sub-regional and regional and global levels. The web-based platform should also assist in linking the current discussions on international targets such as the post-2015 MDGs and the SDGs. The platform must be demand-, not supply-driven. Strategic partnerships should be sought with the private sector so as to ensure the necessary technological support to the platform and also meeting the need to guarantee the funding required for making the platform operational.