Meeting of European Academies of Science

Initiation of European Regional Program on Science Education

Paris, June 2009

Auspices of the IAP & ALLEA

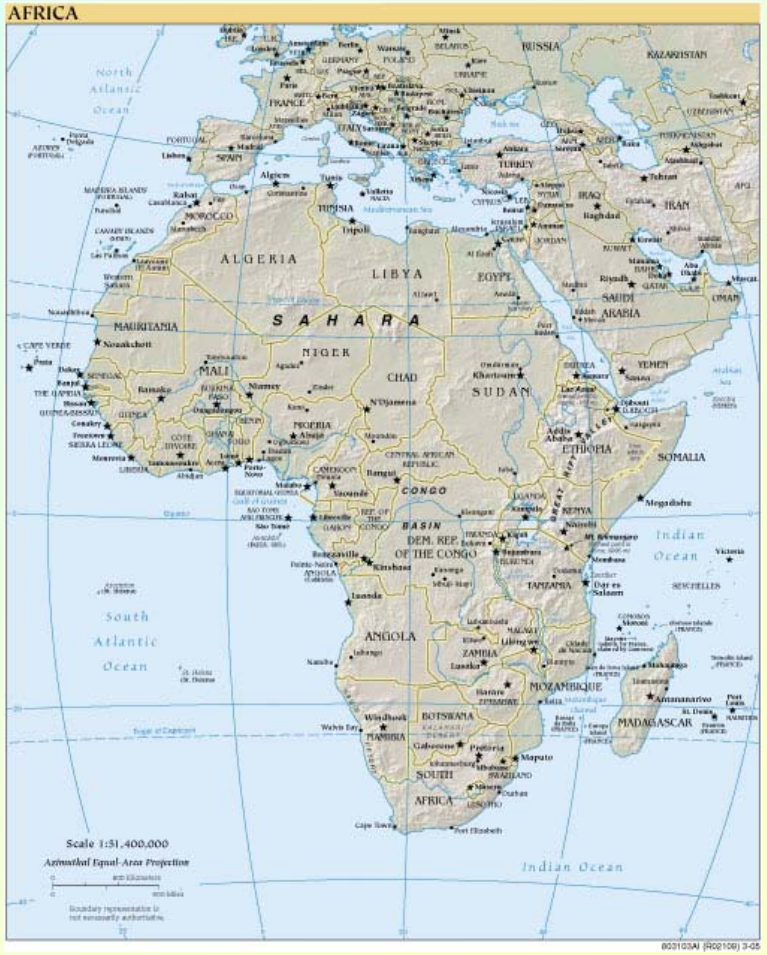
Professor Jorge E. Allende

LAS AMERICAS

- 2004
- The Americas/ IANAS
- 16 Academies
- Grant of 300.000 USD from Organization of American States
- Activities in 15 countries
- 2009, Washington USA Focal Points Meeting

AFRICA/NASAC

- 2005
- AFRICA/NASAC
- 12 Academies
- Activities in Senegal, Uganda, South Africa, Kenya, Cameroon and Nigeria
- 2009 Uganda Focal Points meeting



AASA/FASAS

- 2007
- Asia Pacific

  AASA/FASAS
- 18 Academies
- Activities in Thailand and Turkey
- 2009, Bangladesh Focal Points Meeting

EUROPE

- 2008-2009
- EUROPE
- 7 Academies
- Grenoble (2008) and Paris (June 2009)
- Initial Focal Points Meeting with the Sponsorship of ALLEA

IAP PROGRAM

GENERAL OBJECTIVE

- To improve the level and relevance of Science Education in all countries of the world.

SPECIFIC OBJECTIVES

- To promote the participation of Science Academies in initiatives to introduce or strengthen inquiry-based science education methodologies in pre-university education.
- To stimulate international collaboration at the regional and global levels in activities that improve science education.
- To engage governments, international organizations and private institutions in the activities of science education.
- To generate consensus studies on topics of common interest in science education.

The Strategy of the IAP

- Science Education Program is to channel its main efforts through the activities organized by regional networks of Academies.

- However, the IAP Science Education Program also undertakes to promote and organize global activities on topics that are of common interest to all regions. In addition, this global dimension is monitored by a Global Activities Committee that aims to advise the coordinator of the IAP Science Education Program and to promote interregional cooperation.

- Presently, the Global Activities Committee is integrated by the Coordinators of the Regional Networks:

- IANAS The Americas :Dr. José Lozano (Colombia)
- NASAC-Africa :Dr. Elly Sabiiti (Uganda)
- AASA/FASAS–Asia/Pacific :Dr. Soon Ting Kueh (Malaysia)
- ALLEA – Europe :To be appointed
- Global Coodinator :Dr. Jorge E. Allende (Chile)

- In addition the GAC is integrated by the following experts on science education:

- Pierre Léna (France)
- Hubert Dyasi (USA)
- Wynne Harlen (U.K.)
- Guillermo Fernandez de la Garza (Mexico)
- Wei Yu (China)
- Patricia Rowell (Canada)

Global Activities Have Included:

- Two International Symposia and a Report on Evaluation of Inquiry-Based Science Education.
- An International Symposium on Professional Development of Inquiry-Based Science Education and a Report.
- Planning in 2010 for a Conference on the transition of primary into secondary education of IBSE.

GLOBAL ACTIVITIES 2010

- International Conference on Transition of the Inquiry-Based Science Education Methodology from Primary to Secondary Schools (Tentative October 2010).

- We need a host organization.

- The IAP will provide US$ 30.000 to support international travel for participants for developing countries.

- It will also provide an international organizing committee (the GAC) which will meet in Santiago in January, 2010.

The IANAS/IAP Science Education Program

- Started in 2004 1st Focal Point meeting in October 2004 in Santiago.
- In November 2004, the Ministers or National Directors of Science and Technology of the Americas meeting in Lima, Peru, declared this program a “Hemispheric Initiative” providing political support.
- The IAP has provided support (US$ 25.000 to US$ 50.000 per year) since 2004.
- In 2007, the FEMCIDI fund of the Organization of American States approved support of US$ 330.000 for 3 years time which will end in March 2010.
- Participation of Academies of Sciences in 15 countries: Argentina, Bolivia, Brasil, Canada, Caricom (Several Caribbean Countries), Costa Rica, Colombia, Cuba, Chile, Dominican Republic, Guatemala, Mexico, Peru, USA.,Venezuela.

Activities Supported - 2008

• Indagala Web Portal	Colombia
• Focal Point Meeting	Costa Rica
• Workshop on Regional Collaboration	Venezuela
• Workshop for Primary Teachers on IBSE	Dominican Republic
• Exchange of Teachers from Bolivia to Chile and Colombia	Bolivia
• International Conference on Professional Development of IBSE Teachers	Chile
• Caribbean Workshop on Science Education	Trinidad-Tobago
• Training of Secondary School Teachers in Science	Bolivia
• Workshop on Formative Evaluation	Argentina
• Workshop on Comparative Evaluation	Colombia
• Course on Professional Development For Primary Science Teachers	Peru
• Teacher Exchange from Guatemala to Colombia	Guatemala
• Workshop for Science Educators	Mexico
• Development New Teaching Modules and Training of Experts from other Countries in their use	Brasil

- **14 Countries organized activities**

Major Accomplishments of IANAS/IAP Science Education Program

- It has supported the initiation of new national programs in Bolivia, Peru, Venezuela, Panama, Costa Rica, Dominican Republic, Guatemala and it has started a program in the English Speaking Caribbean.
- The International funds have induced local counterparts from governments, universities and private institutions.
- The FEMCIDI Project has received excellent evaluations and a new project to expand this program into secondary education for US$ 450.000 is being drafted.

Main Concern

- We are confident that the Regional Programs in the Americas, Asia-Pacific and Europe will develop with local resources.

- The African Program is seriously limited to what can be done with the small IAP support. It is necessary to establish robust pilot projects in a few countries to serve as show-cases for the power of IBSE, this will help fund raising.

- Other regions should help to strengthen the African Regional Program. The meeting in Kampala, Uganda on October 15th, 16th ,2009 would be an opportunity to explore how this help can be best used.

The Chilean ECBI Program 2009

- Started with support of the US National Academy of Sciences and of the French Academy of Sciences in 2003, Chilean Academy of Sciences and the University of Chile proposed this initiative.
- Pilot Project of 6 schools in Cerro Navia Municipality 1000 children in 6 and 7 grades, 2 modules.
- It was jointly funded by the Ministry of Education and the Andes Foundation.
- Presently 2009, 270 schools in all 15 Regions of Chile. 100.000 children in urban an rural primary schools. Use 16 modules – 8 of which have been developed in Chile. This is financed completely by the Ministry of Education and has the participation of the Chilean Academy and 12 Universities.

The Chilean ECBI Program Social Cohesion

- In January 2009, the ECBI Program received approval of the Social Cohesion Program donated by the European Union to the Chilean government. This grant of 1.3 million euros will help expand the program, generate a web portal to support teachers and expand the ECBI method to teach secondary school science. An important aspect relates to the Eurolatinamerican school for science teachers.

Components of the Eurolatinamerican School for Science Teachers

- 12 European experts visit Chile to participate in events of science education.
    - Air tickets and 7 days per diem are financed.
- 3 Eurolatinamerican courses (workshops meetings).
    - Euros 20.000 to finance local expenses
- Participants from other Latin American Countries will be financed by the Chilean Ministry of Education.
- 12 Chilean teachers will visit European Educational Centers or Universities.
    - Air tickets and per diem for 10 days are covered
- 12 Chileans monitors will visit European IBSE Centers
    - Air tickets and per diem for 10 days are covered.
- 9 Chilean experts will visit European Science Education Centers
    - Air tickets and 7 days per diem are covered.

Components of the Eurolatinamerican School for Science Teachers

- January 2010, 1st Eurolatinamerican Course – Workshop will take place in Santiago on the topic of Development of Modules for IBSE for Secondary Schools (grades 9-12)
- 3 European experts will be invited and financed Others can join with their own financing.
- Experts from the USA, Canada, and Australia will also be financed from a separate source.
- 6-8 Participants from other Latin American Countries will be financed separately by the Ministry of Education.

Lessons Learned from IAP Program on Science Education:

1. Academies can promote and advise Ministries of Education, Universities, and political leaders about science education.
2. Academy members as distinguished scientists can provide quality control to insure that the science content is solid and current. They can also inspire teachers and children with the fascination of discovery.
3. Academies can provide very valuable international collaboration that can help to increase the level and pertinence of the teaching.
4. Academies obviously cannot implement science education activities at the pre-university level and must collaborate with Ministeries, teacher's organizations, universities, in the implementation of activities. This interaction builds bridges.
5. Academies gain recognition from governmental organizations, educators, political leaders and society in general for the work being done in the field of science education.

Report on the European Conference
Science Learning in the Europe of knowledge

Grenoble, France, 8-9 October 2008

Pierre Léna

Délégué à l'éducation et la formation

Académie des sciences, Paris

The challenges

- The strategic point : teachers *in-service* training ;
- A scale issue : over 10^6 primary school teachers, 10^5 secondary ;
- A time constant issue : 10-15 years for a change ;
- Assessement :
  - Outcome on children ;
  - Teachers formative assessement to transform practices ,
  - System evolution : costs, management of change ;
- Role of scientific community : **science Academies** , IAP, ICSU, CERN-ESO-EMBL…etc + interest of *Science, Nature*…
- Role of industry : Netherlands, UK, Germany…

The Grenoble conclusions

- An increased EU action based on *Open method of coordination* ;
- A thorough action in each member state (subsidiarity) ;
- An intensified cooperation between member states ;

- Need to develop on large scale the successfull practices ;
- Need of a long-lasting effort : a decade or more ;

- Regarding **teachers professional development** ;
- Regarding **contents** ;
- Regarding **dissemination structures** ;

New paths to explore, share, amplify

- An increasing network of model cities/communities :
  - *Pollen* Berlin Conference (May 29, 2009), *Fibonacci* ;
  - Better local integration school/scientists/industry ;
  - Local collaboration formal/informal education ;
  - School/parents ;
- Developing ***formative* assessment strategies** and tools (IAP) ;
- Elaboration of free, high quality **pedagogical resources** ;
- **Training the teachers** :
  - Self-training ;
  - Distance training : role of IT ;
  - Quality criteria for training ;
  - Systemic analysis of teacher training ;
  - Teachers and science community (e.g. ASTEP in France) ;

Key issues

- How to obtain the required amplification, with limited EU seed funds ?
  - Role of **ministries of education** (XXI Century school) ;
  - Role of **Science Academies** (EU IAP Focal Point) ;
  - Role of **research institutions** and ICSU ;
  - Role of **industry** : the Competitivity Council ;
- How to ensure **time continuity** over a decade within EU ?
  - Is the High Level group (ECSE) proposed by Rocard report the solution ?
- How to organize **cooperations outside Europe** ?
  - Science education is a key development factor ;
  - The demand from emerging/developing countries is high (*IAP*) ;
  - Could the EC Development directorate be involved ?

- The conclusions recommend three types of actions, which will mutually reinforce each other :
  - ❿ a thorough action in each nation for the improvement of science education and especially for a renewed pedagogy ;
  - ❿ an intensified cooperation between Member states ;
  - ❿ an increased action based on the EU Open method of coordination.

- The Conference emphasizes two specific aspects to be addressed :
  - the need to learn from successful practices and develop them on a large scale ;
  - the need of a long-lasting effort, of the order of a decade or more.

- Creativity of teachers will stimulate creativity of students. As innovation in science education is made of invention, implementation and dissemination, each of the following items needs addressing, a number of these paths being already explored locally and with success in several EU States :

- **Regarding teachers :**
  - 1. Teachers professional development by :
    - a. developing self-training, distance training, session training tools ;
    - b. developing criteria of quality for training ;
    - c. developing systemic analysis of teacher training (cost, implementation..) ;
  - 2. An *Erasmus* for teachers :
    - a. physical circulation of teachers within Europe, to create a face-to-face community of exchanges and stimulation, in parallel with the scientific community ;
    - b. exchange of experts ;
    - c. an ICT platform and database for collaboration of professionals ;
  - 3. Facilitating, by national and transnational EU networks, close cooperation between :
    - a. teachers with the research community ;
    - b. teachers and schools with industry partners ;
    - c. teachers with centers for informal education ;

- **Regarding content :**
  - 1. Better integration of scientific disciplines, from the point of view of :
    - a. the student : curriculum, activities, diversity of talents ;
    - b. the teacher : understanding of the nature of science, history, ethics ;
    - c. wider practices of interdisciplinary cooperation among teachers ;
  - 2. Experimental access to mathematics at all school levels ;
  - 3. Sharing of resources for curriculum design and implementation ; supporting outreach from research institutions ; material equipment of schools ; quality control with respect to the diversity ;
  - 4. Designing methods of student assessement, in harmony with a renewed pedagogy of science.

- **Regarding structures :**
  - 1. Developing networks of pilot centers, in every EU country, taking into account the diversity of local conditions but closely related to each other Europe-wide, in order to disseminate and capitalize innovations ;
  - 2. Supporting a program of research into student and teacher attitudes and effective pedagogy.

EUROPEAN COMMISSION

Community research

Support for Science Education under the Framework Programmes

European Commission
Research DG
Stephen Parker

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Historical development

FP 5 (98-02): Raising Public Awareness of S&T

FP 6 (02-06): Science **and** Society. Focus on science education

FP 7 (07-13): Science **in** Society . Strong focus on science education

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Science Education in the 7th Framework Programme

Support will be given for the

"creation of an open environment which triggers curiosity for science in children and young people, by reinforcing science education at all levels, including schools, and in promoting interest and full participation in science among young people from all backgrounds"

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Science Education
Part 5 Capacities Specific programme Science in Society

Specifically actions will

- **Support formal and informal science education in schools as well as through science centres and museums and other relevant means**
- **Reinforce links between science education and careers**
- **Support research and coordination actions on new methods in science education**

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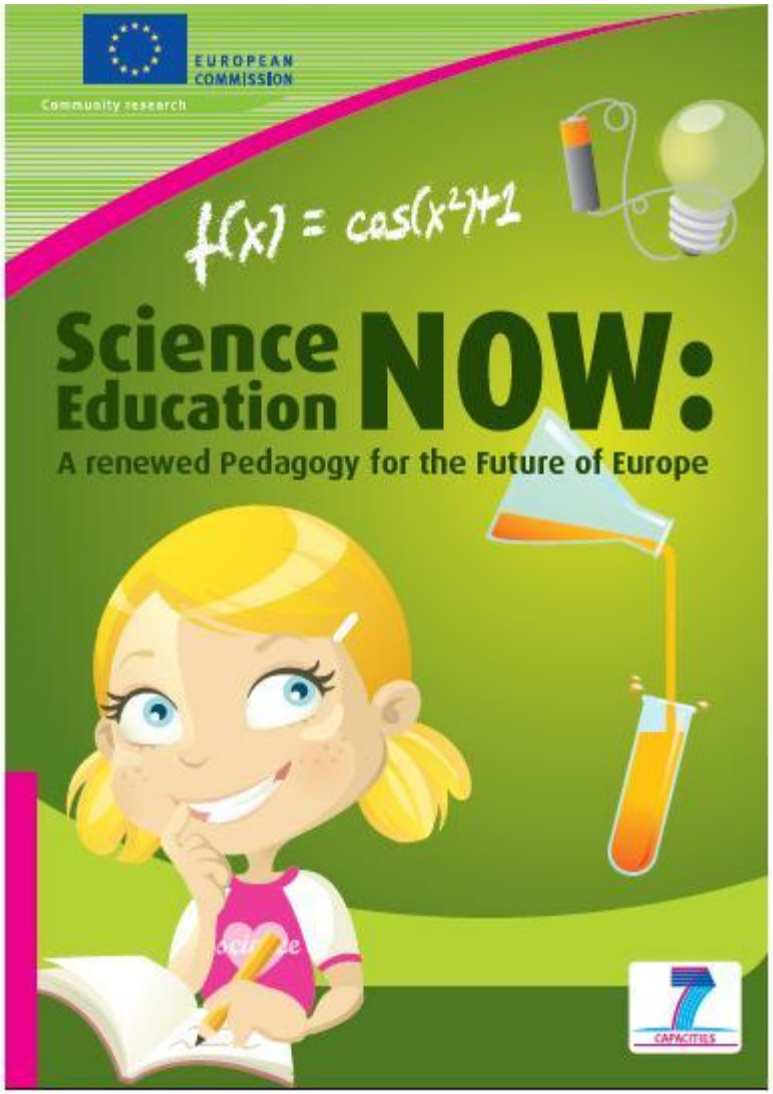

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Science Education Now: A Renewed Pedagogy for the Future of Europe

- European decision-makers must implement change
- Inquiry based science teaching must be introduced
- Special interest of girls…. must be accounted for
- Better participation of local actors and cities needed
- Better articulation between national and European level activities
- Need a coordinating body

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Calls have specific focus on IBSE

2007: Context & Inquiry Based Call (1.8 meuro).
2 proposals funded.

2008: IBSE call (4.78 meuro).
1 proposal funded.

2009: IBSE call (7.5 meuro).
3 proposals will be funded.

2010: ...../.....

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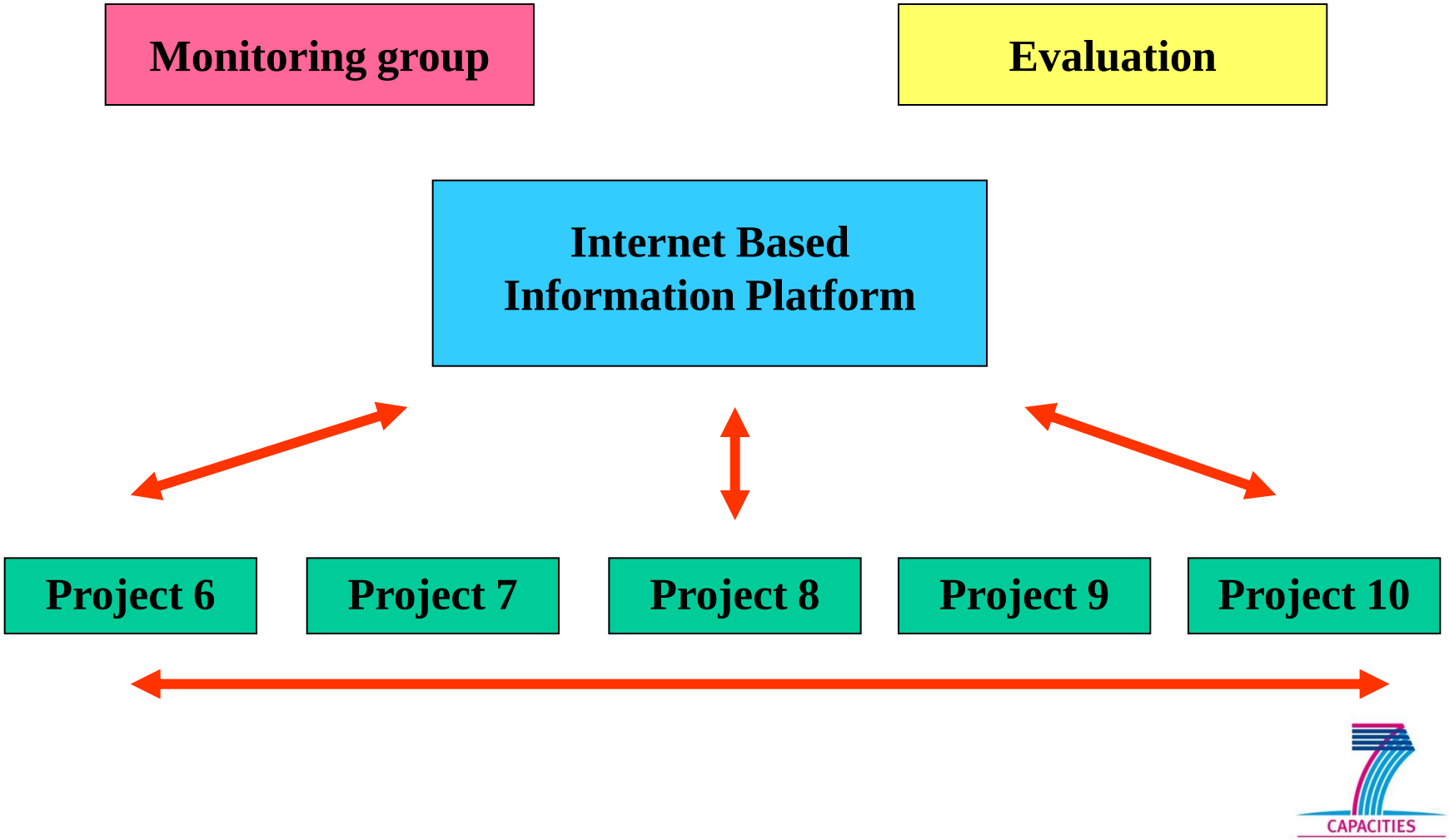
Monitoring group
Evaluation
Internet Based Information Platform
Project 6
Project 7
Project 8
Project 9
Project 10

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Paris, June 16, 2009

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Despite their absence, the Royal Society (UK) and the Royal Sweedish Academy (SWEDEN) have expressed a great interest in this meeting.

Organisation

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