

STATEMENT ISSUED AFTER THE WORKSHOP HELD
AT THE PONTIFICAL ACADEMY OF SCIENCES
ON 19-20-21 NOVEMBER 2001,
AND APPROVED BY THE COUNCIL
OF THE ACADEMY ON 17 FEBRUARY 2002

THE CHALLENGES FOR SCIENCE: EDUCATION FOR THE TWENTY-FIRST CENTURY

We, members of the *Pontifical Academy of Sciences* and experts, after meeting in the Vatican on 19-20-21 Nov. 2001, declare as follows.

The immense and increasingly rapid development of science as an important element in culture bestows a new responsibility on the scientific community, beyond its traditional role of creating new knowledge and new technology. Ensuring proper education in science for every child in the world and, consequently, a better public understanding of science and what science stands for, has become both a necessity and a challenge.

As a belief in the constant capacity of humanity to progress, education requires caring for the children of today and preparing the citizens of tomorrow. Access to knowledge, therefore, is a human right, even more so in the knowledge-based society of the future.

The extremely uneven access to education in today's world generates profound inequalities. Let us not tolerate the existence of a knowledge divide, in addition to an unacceptable economic divide which also includes a 'digital divide'. For, unlike the possession of goods, knowledge, when shared, grows and develops.

Education in science for all girls and boys is essential for several reasons. In particular, this education helps:

- to discover the beauty of the world through emotion, imagination, observation, experimentation, reflection and understanding;
- to develop the creativity and rationality which enable humans to understand and communicate;

- to contribute to moral development and sense of values: the search for truth, integrity, humility, and man's responsibility towards his neighbours and future generations;
- to share the accumulated wealth of knowledge amongst all people, as required by justice and equity;
- to be aware of mankind's interdependence with the environment and the Universe;
- to enable contributions to the solution of the acute problems facing humanity (poverty, food, energy, the environment).

From the perspective of these objectives, it is our conviction that the present state of education in science is of great concern throughout the world, regardless of the local stage of development. In the case of developing countries, in particular, the magnitude of the problem is immense.

After consideration of a number of encouraging experiences in various countries, and the actions of several Academies, we conclude that the following initiatives should be taken without delay, both at a national and an international level. Moreover, they should be shared and integrated within the diversity of cultures found in contemporary societies.

1. The highest level of attention has to be given to science education in primary and secondary schools, including children with special needs.

2. Education in science must be seen and implemented as an integral part of the whole of a person's total education (language, history, art, etc.).

3. The most important contribution to improving education in science in elementary and secondary education lies in helping teachers and parents to cope with this difficult task. This will involve increased resources, partnership, professional development, social recognition and support for teachers.

4. Such a challenge cannot be met without the deepest commitment on the part of the various members of the world's scientific and technological community. Meeting this challenge must be viewed as a new moral obligation.

5. Every means should be used to convey the urgency of the situation to governments. They alone have the capacity to deal with the magnitude of the problem, to provide the necessary resources, and to implement suitable policies. Non-governmental organisations and financial institutions should also participate in such an initiative.

6. Relevant research on science education should be stimulated and encouraged, and should consider the potential of communication technologies.

What is being called for is a global commitment to revitalize science education at school level with support not only from the teachers, parents and scientists, but entire communities, organisations and Governments, for a better and more peaceful world to live in.

Success along these lines, pursued with perseverance and dedication, will constitute a decisive contribution to the socio-economic and cultural development of humanity, the achievement of social justice, and the promotion of human dignity.