

# Connect



UNESCO INTERNATIONAL SCIENCE, TECHNOLOGY & ENVIRONMENTAL EDUCATION NEWSLETTER

VOL. XXIX, No. 3-4, 2004

## Ethics of Science & Technology

THE world faces great challenges, most of them indirectly or directly related to science. Technological disasters, environmental degradation and growing social and economic imbalance between rich and poor have led to an increasing mistrust in science, often directed against the development and application of new technologies.

The development towards a higher degree of contract research and business-led research has taken this scepticism even further. The growing understanding that science is not free from the scientist's disciplinary background, interests, values, viewpoints and relations to other actors in society, underlines the need for the teaching of ethics as well.

Scientists face ethical problems in their choice of education and research field; in their choice of research projects; in how they carry out their research and in how they deal with publication and media. How can we make sure that the scientist maintains high standards of scientific integrity and quality control when the relationship between the researcher and other actors such as universities, the state, corporations and international trade organisations are changing? How can one increase the young scientist's ability to distinguish right from wrong and to feel social and environmental responsibility?

Today, most people agree that one must establish good strategies for securing sustainable development. The teaching of ethics can play a decisive role in the work for sustainability. Ethical values are the principal factor in social cohesion and, at the same time, the most effective agent of change and transformation. In considering the ethics of sustainability, our moral responsibility towards future generations is of prime importance. In living up to this responsibility, we must strive to achieve balance and continuity between meeting the needs of today and the challenges of the future.

Some steps have already been taken towards the teaching of ethics by the United Nations. In 1999, an initiative to strengthen the teaching of ethics was taken at the UNESCO-ICSU World Conference on Science and the Use of Scientific Knowledge, Budapest, Hungary. Section 41 of the Declaration made at this conference states:

*All scientists should commit themselves to high ethical standards and a code of ethics based on relevant norms enshrined in international human rights instruments should be established for scientific professions. The social responsibility of scientists requires that they maintain high standards of scientific integrity and quality control, share their knowledge, communicate with the*

*public and educate the younger generation.(...) Science curricula should include science ethics, as well as training in the history and philosophy of science and its cultural impact.*

Further, the plan of action of this conference goes on to state in Point 71:

*The ethics and responsibility of science should be an integral part of the education and training of all scientists. It is important to instill in students a positive attitude towards reflection, alertness and awareness of the ethical dilemmas they may encounter in their professional life. Young scientists should be appropriately encouraged to respect and adhere to the basic ethical principles and responsibilities of science.*

(Science Agenda – A Framework for Action, UNESCO, 1999)

UNESCO's World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) has committed itself to put this Declaration into action.

But what exactly is 'ethics'? What does it encompass? What is its scope? What are its limits and characteristics...? In order to truly appreciate the role of ethics in the use and future development and science and technology, it is necessary to possess a certain understanding of what is meant by ethics.

Ethics is the systematic investigation of questions of right and wrong, good and bad. It reflects on the different moral

CONNECT is also available on the Science and Technology Education homepage:  
<http://www.unesco.org/education/educprog/ste/index.html>

# High-level Panel Meeting on the United Nations Decade of Education for Sustainable Development (2005-2014)

ON 20 July 2004, UNESCO's Director-General, Mr Koichiro Matsuura, convened a High-Level Panel on the United Nations Decade of Education for Sustainable Development (DESD, 2005-2014). The panel was composed of leading experts in the field: Prof. Alpha Omar Konaré, President of the Commission of the African Union and former President of the Republic of Mali; Dr Akito Arima, Senator and Former Minister of Education, Science, Sports and Culture of Japan; Mr Carl Lindberg, Deputy State Secretary of the Ministry of Education and Science of the Kingdom of Sweden; and Mr Steven Rockefeller, Chairman of the Rockefeller Brothers Fund. The objective of this meeting was for the panellists to give guidance to UNESCO on the DESD, its draft International Implementation Scheme and the launch activities of the Decade.

In his opening remarks, Mr Matsuura stressed the links between DESD and the other international frameworks, noting that UNESCO is devoting particular attention to questions of quality education throughout them all.

The Panel expressed their general satisfaction with the results so far achieved by UNESCO in its preparations for the Decade, in a frank, wide-ranging and constructive exchange of views,

Among the key issues raised were the following:

- the transition from a concept of environmental education to the notion of education for sustainable development (ESD);
- the development of the concept of sustainable development up to the Johannesburg summit in 2002;
- the need to learn from the experience of other decades, build on proven strengths and anticipate the kinds of follow-up mechanisms that will be needed;
- the links between DESD and other frameworks of international action, notably EFA (Education for All), the UN Literacy Decade and the MDG (Millennium Development Goals) process;
- the importance of transmitting key values;
- the role of faith communities in the ESD debate;
- the important role of culture;
- the place of ESD within quality education; and
- the need for sound indicators, effective monitoring and regular reporting on DESD action.

The Panel regarded UNESCO as uniquely positioned to play the leadership and coordination role for the Decade, which was characterized as a golden opportunity for everyone involved in education. The Panel discussed a range of practical issues, including the international, regional and national launches of the Decade and the logos to be used. The members of the Panel emphasized their personal commitment to the Decade and their willingness to continue serving on the Panel, though they recommended that its membership be extended in terms of gender and the representation of civil society.

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principles and evaluates them critically. In many cases our principles survive this critical scrutiny. However, critical reflection often shows that some principles are unsatisfactory; they have to be modified or totally rejected. Sometimes we find other, more satisfactory principles that replace them. The aim of ethics is to find a set of moral principles that there are good reasons for accepting and that ought to guide us in our lives. Thus, the study of ethics is important not only for our individual lives but also for developing the insight and competence that human beings as a community need in order to face the challenges of the present and the future in a reasonably successful way. Many of the most important ethical predicaments the world community is facing today arise in connection with science, in scientific research and in the development and applications of new technologies, notably biotechnology. The applications of science and technology have consequences for almost all aspects of our life: travel, communication, internationalisation, immigration, cultural pluralism, development of new weapons, natural resources management, the environment, etc. Many of the possibilities opened up by science are destructive and negative. But science also makes possible better living conditions, more awareness of the needs of people in other parts of the world and greater possibilities to help them.

The last decades have seen a rapidly growing awareness of such ethical issues and the need to deal with them. This rising interest in ethics seems to be due mainly to seven factors:

1. **Rapidity of change:** As much has been published during the past 12 years as during the whole earlier history of mankind. Changes are hard to measure, but if they have any relationship to the speed of publications, we might go through more change in a few years than earlier generations in a whole lifetime.
2. **Increasing intercultural contact:** This not only strengthens our awareness that many of our norms and values are culturally conditioned, but it makes us ask which ones we ought to accept and why.
3. **Transnational communications:** Internet, satellite TV and other media

that cross national boundaries create particular ethical issues e.g., what is forbidden in one country may be legal in others.

4. **Weakening of ethical traditions:** During the last generations, upholders of ethical traditions such as the family, religious institutions, social groups, etc have progressively been losing influence and are uncertain of their advisory competence with respect to the new ethical challenges.
5. **Magnified potential of science and technology:** New developments in science and technology have immensely increased human capacity for good and bad. The magnitude of the consequences of human actions can thus be immense.
6. **Concern for the environment:** The increased magnitude of human impact on the environment and the consequent deterioration of the latter has given rise to a growing concern for achieving sustainable development with the principle of precaution in dealing with complex systems whose functioning is not completely understood.
7. **Advances in certain technologies:** Notably as concerns gene technology, responsible for the creation of situations that are radically different from any faced by humanity before. This has created widely differing and even conflicting legislations in different countries.

These factors figure among the major reasons why more and more people today are asking questions that were formerly the domain of philosophers and theologians. This has led to an increased interest in ethics in all parts of the world. Since the reasons invoked for the interest in ethics are not a matter of evanescent fashion or passing intellectual trend, this interest is likely to stay – like the changes that brought it about.

So the question that naturally arises in this situation is: what can be done? One main thing is to develop competence in ethics and use it to deal with the issues that face us. Ethics is one of the first fields of study where mankind attempted to gain insight through disciplined thought. As in other fields of scholarship, if one neglects what has

been done, one is likely to repeat errors and mistakes and propound views that have already been found inadequate. The teaching of ethics is thus a crucial factor to avoid such errors, to distinguish good arguments from bad as well as to develop the capacity for sound argumentation.

The central aim of the teaching of ethics should be to develop the students' ability to recognize and analyse ethical issues in order to be able to reach decisions on how to act ethically. This comprises several partial aims such as:

- Increasing the students' awareness of ethical issues
- Providing a deeper understanding of ethical matters and greater clarity in ethical questions
- Developing the ability to place ethical problems in a wider context, making explicit the alternatives that we may choose from and how their various positive and negative consequences are experienced by those who are affected by them
- Developing the skill for ethical analysis and argumentation
- Determining areas where social practice or legislation is at odds with ethical standpoints which seem to be well-founded

Many countries do not presently have people with the required qualifications. This is true for many rich as well as developing nations. But whereas rich nations can meet this challenge by establishing programmes to build up competence in ethics, developing countries would need support from abroad to develop such competence. In many developing countries there is not only a lack of qualified teachers and up-to-date materials for ethics programmes but also little opportunity at the international level for their researchers and teachers to interact or obtain training for capacity building.

It is also important to note that ethics courses should be open to cultural and traditional differences. There are great regional differences concerning what can be considered as the most burning ethical problems. The challenges are also quite different in poor and rich countries. For the developing countries it is particularly important to build up competence in ethics as they are exploited in numerous ways such as unfair trade agreements; bad treatment of workers;

takeover of natural resources; patenting of biological material or insights based on traditional knowledge; introduction of plants/cultivation methods destructive of traditional life styles, etc. All this goes to show that developing countries stand to gain the most by building up ethical competence.

Ethics is of concern to all. We all have our views on ethical issues and we express them. However, this does not qualify us to teach ethics. Teaching of ethics is not imparting to others our ethical views: it means enabling others to take their independent stand on ethical issues. This requires a thorough

and broad competence in ethical theories and ethical argumentation. It is the duty of people in charge of teaching programmes in ethics to ensure that the teachers have such qualifications. This is also one of the objectives of UNESCO's programme on Ethics of Science and Technology.

## UNESCO Activities

in the field of

# Ethics of Science and Technology and the Environment

UNESCO's Division of Ethics of Science and Technology is active in the fields of applied ethics such as bioethics, ethics of the environment, ethics of outer space, ethics of science, and teaching of ethics. UNESCO's implication in these fields stems from the recognition that science and technology today belong to the international domain and that scientific knowledge is shared among the world community of scholars and researchers. The impact of new discoveries and innovations goes beyond national borders, despite the uneven growth of science in different nations. Moreover, the ethical assessment of the benefits and harms of new developments as well as of the promises and potential dangers of scientific discoveries and technological innovations, is not the prerogative of selected persons or countries. Ethics concerns humankind as a whole. Thus, all Member States of UNESCO should be involved in the work of reflection, assessment and evaluation in order to determine what is good, valuable, desirable or permissible in the development of science and technology.

In the area of **environmental ethics**, the activities of UNESCO and its World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) started in 1999 with the issue of fresh water. The work led to the adoption of a set of recommendations by COMEST (2001) and the publication (May 2004)

of *Best Ethical Practice in Water Use* in which five examples of proper ethical management of fresh water are presented and analyzed.

More generally, from a moral point of view it is necessary to clarify the arguments for safeguarding the environment and the extent to which it should be safeguarded. One of the main issues in this regard is to know if rights are the basis for justifying protection of the environment. Rights should be bestowed to particular entities or organisms because they have intrinsic value. If the answer is affirmative, the subsequent question is on whom can rights be bestowed: do all living creatures have rights by themselves? Or only sentient beings? Or only creatures of sufficient intelligence? Some environmental ethicists argue that it is not only the individual who can have rights, but also the species or the ecosystem to which he belongs or even the whole terrestrial ecosystem (*Gaia hypothesis*). Safeguarding the environment may be justified by granting rights to non-human creatures. It is not only human beings that have intrinsic value, but all or some other living beings too. However, other ethicists claim that the best protection of the environment will flow from the assessment of the impact on human life of changes in the environment. Moral assessment should be based on evaluation of the consequences of actions. If this is the case,

how should the impact of actions be evaluated? Should, for instance, aesthetic considerations be taken into account? This utilitarian point of view is not necessarily less favorable to the environment than the one based on the rights of living beings, taking into account the intimate interrelationships between human beings and their environment.

Take the example of gorillas: of what interest for human beings is the preservation of this species? Is it the genetic proximity of human beings and gorillas? Is it the proximity of their social organizations? Is it because they have feelings or sentiments? Each of these hypotheses implies a hierarchy between animals and hence, implies that if it is worth protecting gorillas, it may not be the case for other endangered species. The notion of sustainable development, often used in discourses concerning the environment, has been widely criticized by environmental ethicists. This notion is closely linked to the idea of *economic development*, which we know implies *per se* the destruction of the environment. It is indeed an historical fact that economic development has always been based on an unlimited exploitation of natural resources. So this idea remains to be clarified and analyzed.

It is in order to address these issues, raise awareness about them and explore the possibilities of international action, that UNESCO's Division of Ethics of Sci-



ence and Technology has constituted a group of experts in environmental ethics whose mandate is to:

1. Prepare a "state-of-the-art" of environmental ethics, and
2. Help the Division to prepare a Policy document on the ethics of the environment that would propose international actions in the field, including a framework for an international declaration.

The state-of-the-art study will be published as the first volume of the *Ethics of Science and Technology Series of UNESCO*.

Among the other issues addressed by the Division of Ethics of Science and Technology, those related to the **ethics of outer space** are relevant for the environment. Monitoring of earth by satellites and the data obtained from satellites is raising three kinds of morally relevant questions:

1. The (mis)match between the data and their users.
2. The economics of satellites, and
3. The qualification of data.

COMEST has recommended using a distinction between three kinds of satellite data: scientific data (these must be made freely available); environmental data (which must be made available when needed); and other data (which are strictly commercial and submitted to a strictly commercial logic). However, the question here is to draw the exact lines between these kinds of data. For example, which data related to the environment should not be at the same time considered scientific data? Furthermore, from the perspective of social science, very little data can be considered as lacking in scientific interest.

Some issues in the ethics of outer space are also very similar to issues in environmental ethics. The question of the justification of our respect for the

environment also applies to celestial bodies and to space itself, in particular if, as it seems more likely than before, non-intelligent extraterrestrial life will be discovered in the near future. More generally, the conquest of outer space raises the issue of respect for our own planet. There is indeed a connection between the idea of discovery and conquest of new spaces (including outer space) and the unrestricted exploitation of natural resources. One of the ethical issues raised by the revival of space conquest is the appropriation of space and celestial bodies. On establishing manned lunar stations or effecting Mars landings, do certain nations have the right to lay a claim on this extra-terrestrial land?

Ethics in itself is intrinsically related to being human. The moral point of view requires human beings to take into account the interests and views of fellow human beings in order to overcome limited sympathies and sentiments. Every human act can be beneficial or detrimental to other human beings. It is the responsibility of human beings (in contradistinction to other species in the universe) to consider the good and bad dimensions of their actions. To act responsibly is the result of learning and doing.

It is in this perspective that the last ordinary session of COMEST (Rio de Janeiro, Brazil, December 2003) put emphasis on **ethics education** with the adoption of the report *The Teaching of Ethics*. The report, arguing that it is necessary to teach ethics in science, explores various ways to educate future scientists in ethics and to make them aware of their future responsibilities. It also determines the aims and priorities of such teaching, stating that the central aim of teaching ethics "should be to develop the students' ability to recognize and analyze ethical issues in

order to be able to reach decisions on how to act ethically". It recommends notably:

- developing ethics teaching at three levels: elementary level for all students, advanced level for PhD students in general, as well as a PhD in Ethics;
- the development of courses, notably using video and computer technology, by organizations such as UNESCO;
- worldwide partnerships to these ends and a special effort for developing countries;
- establishment of UNESCO Chairs, prizes, and an international board of experts to advise UNESCO and teaching institutions throughout the world.

These recommendations are already in the process of implementation through the Ethics Education Programme of UNESCO. In this programme, UNESCO promotes the development of ethics teaching courses (through the creation of international programmes involving cooperating experts from various countries). A network of regional documentation and information centres as well as a global database (Global Ethics Observatory) will support the development of teaching programmes. The creation of international programmes will be stimulated through the establishment of a fellowship fund. Quality assessment of programmes and possible certification will be one of the duties of an Advisory Committee of Experts that is in the process of being set up.

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# UNESCO STEE Activities

## Latin America and the Caribbean

THE focus of UNESCO's Regional Office in Education for Latin America and the Caribbean (OREALC) in the matter of Science, Technology and Environmental Education is on:

- Supporting development and dissemination of innovative curricula, materials and practices
- Encouraging changes in science teacher training at the pre- and in-service level
- Promoting scientific literacy
- Strengthening development of networking
- Creating interphases in joint work between academicians, trainers, research workers in science education and teachers

In this context, the following activities were carried out by UNESCO/OREALC the first half of 2004:

### Training and Exchange in Science Education

On 21 April 2004, a meeting was held on this topic with the participation of 50 basic and middle level teachers and research workers in science education together with representatives of teacher training institutions.

The discussions focused on:

- interchange of experiences
- updating the content of different science disciplines as well as of all that refers intrinsically to science teaching and learning
- use of science pedagogy and psychology of learning as a basis for updating

Subsequently, 2 groups of teachers were formed to work on furthering science education. One will focus on the first cycle of basic education whereas the other will concentrate on the 11-14 yr age level.

The objectives of the groups are to promote reflection on a two-way interactive methodology where teaching practices are based on results of pedagogical research on the one hand

and on the other, teacher identified problems are taken up for pedagogical research whose results can then be used in teacher training. The reflection takes into consideration inputs from science education, learning psychology, sociology and, of course, scientific advances. The work of both groups is meant to promote exchange of experience of classroom practice. UNESCO/OREALC has committed itself to facilitating backstopping for the work of the two groups in technico-intellectual, documentation, bibliographic domains as well as in promoting teacher exchange between group members and those of other countries of the region.

### Training Workshop for Science Teachers, Teacher Trainers and Research Workers

In the last week of April 2004, a Training Workshop on Science Education for teachers, teacher trainers and research workers was held at the Universidad de Concepcion, Chile. The workshop, conducted under the auspices of the Faculty of Education and the Regional Office of Education, was based on the work of Dr G. Soussan on the teaching of experimental sciences (v. *Connect*, vol. xxix, no. 1-2, 2004) which aims to serve as a tool for the on-going training of both science teachers as well as teacher trainers. This document had been presented previously in Santiago de Chile at the Pontificia Universidad Catolica de Chile to some 100 educators. At the Universidad de Concepcion, apart from educators, the participants included teacher trainers and research workers as well as students.

### Workshop on Scientific and Technological Literacy (STL)

This workshop was organised in the context of the Capacity building for

EFA (Education for All) project (v. *Connect*, vol. xxix, no. 1-2, 2004) in Buenos Aires, Argentina, 12-13 July 2004. The objectives of this workshop were to define the orientation of the project by means of a survey of the prevailing conditions in STE as regards gender and socio-economic considerations; examples of good practices in the matter and suggestions for their adaptation for capacity building of educators; and definition of indicators to be used in the conceptualisation of what is - and what is not - STL.

### Meeting on The Role of Science Education in Education for Sustainable Development (ESD)

This regional meeting was held in Buenos Aires, 14-16 July 2004, with participants from Argentina, Chile, Cuba, Peru and Uruguay as well as experts from France and Spain. The main themes taken up in the meeting were: problems encountered by and perspectives of ESD with regard to the contribution of science education and difficulties encountered in providing an equitable and quality science which can effectively contribute to ESD. The common preoccupations of the participants centred on how to orient science education for children and youths of the region toward ESD. The fact that participants comprised researchers, teachers, directors and teacher trainers, made it possible to have a fruitful discussion with the hope of finding strategies for future solutions. These were analysed in greater detail on the final day when various ways and means were examined which could contribute to a better perception of the emerging planetary situation and to foster attitudes and behaviours for the promotion of sustainable development.

Apart from these activities, OREALC initiated a collaboration with the Chilean Ministry of Education and the



National Corporation of the Environment (CONAMA) for strengthening the certification system of environmental schools. Thus, OREALC was entrusted with providing backstopping for the groups of regional coordinators responsible for certification of environmental schools. Three meetings have been planned for this work: in Arica, Concepcion and Valparaiso, where the focus will be on student- and teacher-centred methodologies in environmental education. It is hoped that the certification system facilitates establishment of certain environmental standards to measure the environmental component in three areas of educational practice: Pedagogy, School Management and Relationship with the Environment.

OREALC in collaboration with the UNESCO Chair in Science Education for Latin America and the Caribbean also initiated the publication of a series of books targeting science teachers and teacher trainers. Two main orientations have been defined. The first relates to the updating of pedagogical aspect of science education, whereas the second, in view of the vertiginous speed of changes taking place in the world, concerns the updating of scientific content. The first two publications in each orientation were presented at the III Ibero-American Congress of the UNESCO Chair in Science Education in Guatemala, 5-9 July 2004. Currently, a publication on promoting interest in scientific culture targeting 15-18 yr old youths is under production. This book is the fruit of a joint

initiative of OREALC, science education research groups from the universities of Valencia and Alicante (Spain) and the Latin American Institute of Education (IPLAC) located in Cuba. The rationale for this book is the decreasing interest of secondary level youths for science disciplines leading to a lack of candidates for higher education in sciences. The lack of interest in, not to speak of the total rejection of, science studies associated with the very low accomplishment rates of youths, is a matter of great concern in the region.

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## Investment in Education, Science & Technology:

### Economists' and Entrepreneurs' Views

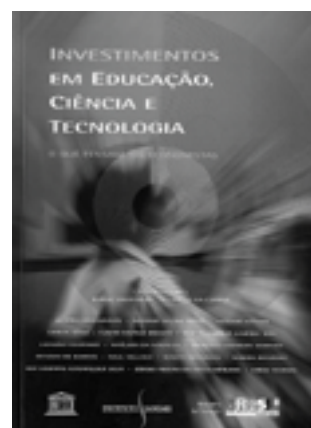
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*INVESTIMENTOS em Educação, Ciência e tecnologia: o que pensam os economistas* (*Investment in Education, Science and Technology: The Economist's Viewpoint*) (2004, 190 p.) and *Investimentos em Educação, Ciência e tecnologia: o que pensam os empresários* (*Investment in Education, Science and Technology: The Entrepreneurs' Viewpoint*) (2004, 203 p.) are two publications of UNESCO/Brazil aimed at intensifying a crucial and necessary debate within the Brazilian

society on how to channel and stimulate private and public investment in fundamental areas for national development, such as education, science and technology. In order to address this issue, and as part of the project *Pact for Education*, UNESCO/Brasilia, the Itau Cultural Institute, the Ben Sangari foundation and the Ministry of Education have solicited a number of experts and national personalities to provide their thoughts and viewpoints on the importance of sound and sustainable investment in these areas.

This objective of the project is to show the Brazilian society and its main leaders the importance of education, science and technology within the context of a globalised society. Despite the country's progress in quantitative terms (basic education – 1st through 8th grade – is almost universal and the scope of high school and college education has been broadened to a great extent), Brazil is still far from reaching the minimum educational standards to meet globalisation demands. The country currently



invests more in education than many countries of the region - approximately 4.3% of its GNP. Nevertheless, past omissions are responsible for a great deficit which can be demonstrated by the fact – among others - that the country still counts 30 million illiterates. As regards science and technology, the country has made progress in terms of the number of articles published internationally, but unlike South Korea, Malaysia and several other countries, Brazil has not been able to convert

this knowledge into technology and patents.

Since education, science and technology have not yet been made national priorities, UNESCO/Brasilia decided to consult leading national authorities on these themes and to publish their viewpoints in a series of books in order to reinforce efforts to make acquisition of knowledge and education the top priorities for the nation's development.

The first two books of this series, mentioned above, have already been published in Portuguese. For the first book, 16 nationally and internationally known economists – including senators, ex-Finance ministers, UN officials and academics – have contributed articles making out a case for the urgent necessity to develop sound and consist-

ent public policies based on education, science and technology in the inexorable process of globalisation. In the second, 29 influential Brazilian entrepreneurs demonstrate the advantages of placing education, science and technology as high and strategic priorities in their productive sectors.

The contributions of both economists and entrepreneurs clearly show that education and knowledge are privileged investments that may help the country overcome social inequality and poverty. They suggest several paths that will be used by the Pact for Education project, which is currently being developed and whose objective is to propose not only new policies but also alternatives to fund them. This will be done with the support of important

leaders in the house of representatives, the production sector and civil society. With this project, UNESCO hopes to offer an effective contribution to Brazil. The first discussions have begun with government officials and members of opposition parties and so far, the results have been encouraging.

The next book in the series, due to be published shortly, will be devoted to the viewpoint of journalists.

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## Asia and the Pacific

THE following activities in STEE were carried out by UNESCO/Bangkok in the Asia-Pacific region in the first eight months of 2004:

**Primary Science Workshop** (Brunei Darussalam, 12 – 17 March 2004)

This workshop was organised by the Brunei Association for Science Education (BASE) in the framework of the annual National Science Week with support from UNESCO/Bangkok. The participants included notably 120 primary science teachers, resource persons from the International Council of Associations for Science Education (ICASE), the National Institute for Science and Mathematics Education for Development (NISMED) University of the Philippines and the University Brunei Darussalam.

The workshop consisted of plenary lectures and group activities on:

- Primary science education: A challenge to promote science and technology literacy for all;
- Science teachers preparing their own teaching-learning materials;
- The outstanding young scientists award, the SEAMEO experience;
- Interactive teaching-learning activities and preparing high tech low-cost science equipment; and

- Performance-based assessment and evaluation in science using rubrics.

A public lecture was also held on "High Tech Low-Cost Science Equipment", which attracted an audience of top officials of the Ministry of Education and officers and members of BASE.

**Seminar on Best Practices and Innovations in the Teaching and Learning of Science and Mathematics at the Secondary Level** (Penang, Malaysia, 18-22 July 2004).

The seminar brought together educators from the APEC (Asia Pacific Economic Commission) economies to demonstrate and discuss pertinent issues associated with 'best practices' in science and mathematics teaching and learning. It included representatives from Australia, Brunei Darussalam, Chile, Hongkong, Indonesia, Japan, Malaysia, Mexico, New Zealand, Singapore, Thailand and USA.

The seminar had six objectives:

1. to develop human resource through sharing of expertise and knowledge among APEC member countries;
2. to enhance the skills and knowledge of teachers/educators in science and mathematics at the secondary level;
3. to introduce best practices and innovations in the teaching and

learning of secondary science and mathematics;

4. to enhance the quality of school teachers via the use of innovative instructional technologies in teaching and learning;
5. to disseminate proven best practices in science and mathematics education that enabled APEC member economies to improve the quality of education;
6. to establish a platform for networking, sharing of information, expertise, implementation strategies and mechanisms in the delivery of science and mathematics education.

The presentations focused not only on the different levels and disciplines of science but also on the different aspects and types of teaching and learning approaches and the work of the seminar succeeded in achieving the objectives that had been set out.

For copies of the Report, please contact: *Dr. Azmi Zakaria, Director, Educational Planning Research and Development (EPRD), Ministry of Education, Malaysia.*

**Regional Seminar on Policy, Research and Capacity Building for Educational Innovation for Sustain-**





**able Development,** (Tokyo, Japan, 27 July to 3 August 2004).

This regional seminar was organised by the National Institute for Educational Policy Research (NIER) of Japan and the Asia-Pacific Programme of Education Innovation for Development (APEID), UNESCO Bangkok. It was planned as a follow up to the NIER-UNESCO-APEID Strategic Development Meeting (February 2004) and the Mobile Training Team (MTT) Evaluation Meeting (March 2004), both activities implemented within the APEID 7th Programme Cycle adopted by its Member States and supported by the Japanese National Commission for UNESCO, and the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan.

The seminar brought together policy makers and experts from different academic disciplines to:

1. share information/experiences on policies and research related to education for sustainable development (ESD);
2. identify research studies/findings and exemplars of best practices in ESD in various educational areas (school management, curriculum development, training of teachers, development of teaching-learning materials, systematic evaluation of learning achievement on ESD, localised actions and challenges in implementing DESD (Decade of Education for Sustainable Development, 2005-2014) activities;
3. discuss policy issues and strategies for educational innovation and research to contribute to the preparatory work for the DESD;
4. develop research-based visions and agenda of ESD in regional/national development contexts and their relevance to APEID programme; and
5. strengthen partnership and networking for broad international partnership in policy formulation in implementing the DESD.

Recommendations formulated to contribute to the celebration of the DESD figure in the Report of the meeting. For copies please contact: *Mr. Ryo Watanabe, Director for International Cooperation, NIER, Tokyo, Japan.*

UNESCO/Bangkok is currently working on three research studies on Gender and STE. The first is being conducted in Nepal; the second is due to begin in

Philippines and the third is being carried out by SEAMEO RECSAM in Indonesia, Malaysia and Myanmar. The final objective of these studies is to find ways of motivating girls to take up science careers.

1. **Nepal:** Girls in Science and Technology Education: Interest, Performance, and Participation at the Higher Secondary Level

This study is being carried out by the Research Center for Educational Innovation and Development (CERID), Tribhuvan University, Kathmandu, Nepal, with support from UNESCO Bangkok.

The objectives are:

- To undertake a documentary review based on a gender perspective of the current national education plans and curriculum related to girls in STE;
- To find out girls' interest and performance in physics, chemistry and biology in higher secondary schools;
- To study the opinion of science teachers, parents of the girls and other stakeholders such as curriculum experts in science education and women scientists on how to motivate girls to go into science careers;
- To find out what occupations are available/will be provided for girls who will pursue scientific and technological careers; and
- To recommend girl friendly strategies in STE on the basis of study outcome.

Many national and regional seminars on the educational situation of Nepal have led to the realization that policy and curriculum regarding STE needs to be revised on the basis of the changing context and development needs of the country. It is therefore very essential to develop a strategy based on the review of policy and curriculum. One major policy which needs to be looked into is the participation of girls in S&T. This study, focusing on girls' interest, performance and participation in STE at the higher secondary level, is thus considered to be more than timely.

(For further information contact: *Dr. Hridaya Bhattacharya, Director, CERID, Tribhuvan University, Kathmandu, Nepal*)

2. **Philippines:** Gender Differences in Scientific, Technological and Environmental Literacy among Elementary and High School Filipino Students

The study to be undertaken by the Pundasyon sa Pagpapalaunlad ng Kaalaman sa Agham sa Pilipinas (Foundation for the Advancement of Science Education in the Philippines) with support from UNESCO Bangkok, will compare the level of scientific, technological and environmental literacy (STEL) of grade 6 pupils and fourth year high school students in selected schools in Regions 3, 4 and the National Capital Region. Furthermore, it will look into gender differences in STEL in terms of the following variables:

- performance in a STEL test
- attitude toward and interest in science, technology and environment
- career choices
- level of awareness and concern for the impact of S&T on society and the environment.

It will also look into the differences in STEL level of and attitudes of students in rural and urban schools.

(For further information, contact: *Dr. Merle Tan, Director, National Institute for Science and Mathematics Education Development (NISMED), University of the Philippines Diliman, Quezon City, Philippines*)

3. **SEAMEO-RECSAM:** Girls' Interest, Participation and Performance in Science and Mathematics: Cases in Indonesia, Malaysia and Myanmar

This study is being carried out by the Research Division of the Southeast Asian Ministry of Education (SEAMEO) Regional Centre for Education in Science and Mathematics (RECSAM). It is focused on girls' participation, interest and performance in science and mathematics at the higher secondary level and has the following objectives:

- To study and compare girls' interest in pursuing science- and mathematics-oriented careers and extent of participation in science and mathematics-related activities in three SEAMEO Member Countries: Indonesia, Malaysia and Myanmar;
- To analyze performance in science and mathematics of girls who are interested to pursue science- and mathematics-oriented careers;
- To conduct interviews with the selected students, their science/mathematics teachers and parents to determine factors that motivated their interest and participation in sci-

ence and mathematics-related activities/careers;

- To survey opinions of science/mathematics educators, science enthusiasts in the community and other stakeholders on what motivates and increases girls' interest and participation in science/mathematics-related careers/activities;
- To determine existing policies/practices pertaining to women's partici-

pation in science and mathematics oriented careers in the participating countries (This may involve institutions of higher learning and education ministries).

(For further information, please contact: *Dr. Azian Abdullah, Director, Southeast Asian Ministry of Education (SEAMEO), Regional Centre for Education in Science and Mathematics (RECSAM), 11700 Glugor, Penang Malaysia*)

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## Education for Sustainable Development (ESD)

### Activities in Cambodia

SINCE 1997, UNESCO/Phnom Penh has been actively engaged in the implementation of ESD in Cambodia. The activities have centred on curriculum development, capacity building, as well as development and dissemination of resource materials.

In the matter of curriculum development, it has succeeded in introducing Earth Science and Environmental Sciences in secondary education, from grades 7-12. In this context, textbooks and teachers' guides have been developed, published and disseminated throughout the nation. Relevant training has also been provided to curriculum specialists and teacher trainers. However, due to lack of adequate financial resources, it has thus far not been possible to provide training for the majority of teachers.

In the matter of materials development, the teachers' guide entitled *Learning for a Sustainable Environment* (prepared by UNESCO/Bangkok and Griffith University, Australia) was translated from English into Khmer and adapted for local use. It was field-tested in 2002-03 and will shortly be published for nationwide use. A series of posters entitled «*Biodiversity in Questions*» was also translated into Khmer and will be disseminated shortly after publication. Currently, UNESCO/Phnom Penh is in the process of implementing an experimental project on Appropriate Technology in the Koh Sla Commune, focusing on a sustainable use of fresh water and energy for peace and development. The project has been integrated in adult literacy, skills training and non-formal primary education for out-of-

school youth. Technical cooperation with experts from UNESCO/Jakarta is being sought for the development and production of an easy-to-use guidebook for the villagers/learners.

A model community learning centre is also under construction where appropriate technology and best practices in ESD will be taught, exhibited and used for quality of life improvement and poverty reduction.

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# STEE Activities Worldwide

## International Workshop: Girls and Science

Cologne, Germany, 3-5 June 2004

THIS International Workshop was organized in the framework of the Socrates /Comenius 3 Network "Hands-on Science" (H-Sci) of the European Commission\* by the City of Cologne School Office (Germany).

The 3-day workshop targeted scientists, teachers and students, politicians, representatives of women's rights groups, education policy makers as well as representatives from the industrial sector. The rationale of the workshop was that despite the tremendous progress made by women in every facet of social life and the fact that many scientific and technological breakthroughs are attributable to them, women are still severely under-represented in all major science areas. Although the last two decades have seen a marked improvement in the access of women to science, girls and women still face a number of barriers at the school and university level that discourage them from opting for science and technology in the first place and then from choosing careers in these areas. By bringing together the actors engaged in the various aspects of this subject, the workshop aimed to encourage discussion, exchange of views, experiences and contacts and thereby to trigger the search for possible solutions.

The participants included representatives from the following European States: Belgium, Finland, France, Greece, Italy, Malta, Poland, Portugal, Spain and the host country Germany, as well as from India, Oman and USA.

The workshop consisted notably of keynote presentations, thematic sessions, practical demonstrations, poster sessions and field visits to schools employing innovative, hands-on teach-

ing methods as well as to a renowned enterprise specialising in the production of pedagogical science equipment.

The following very interesting keynote presentations made by specialists in the various aspects of Gender and Science Education set the tone for the meeting:

- *Gender and Professions*, a survey by the German National Agency for Labour focusing on gender distribution notably in S&T related professions
- *Roberta – Girls discover robots*, a project funded by the German Federal Ministry of Education and Research, which gives the lie to the conception that robotics does not rhyme with femininity
- *Girls & Science: A psychological perspective*, based on a research project conducted at the Freie Universität Berlin, which opens up new perspectives on a much debated subject
- *Go for Chemistry: Competitions and Girls' Efforts*, on an experimental project in North Rhine Westphalia, Germany, meant to stimulate girls' interest in chemistry through competitions
- *Gender in Hands-on Science*, presented by the KompetenZZentrum, Bielefeld and Braunschweig University.
- *Hands-on experiments*, presented by the Leyboldt Didactic company.

They were followed by presentations of relevant research findings as well as successful hands-on projects in Europe and abroad; demonstrations of science and technology practice by girls; poster sessions; visits to schools practising innovative hands-on science as well as a trip to a reputed science pedagogical materials manufacturing enterprise.

Accessorily, the city of Cologne presented the Köln Odysseum project (see *below*), an ambitious, ground-breaking centre devoted to the popularisation of Science/Technology/Environment, targeting young and old, educators and students, specialists as well as the general public, due for completion in 3 years.

The most notable aspect of the workshop was the extent and variety of experiences that were presented to the participants. The issue of women's access to science is not new and has been the focus of many debates and fora. Although much has been accomplished in certain parts of the world, there is a general consensus worldwide that a lot more remains to be done in this area in the developed as in developing nations. In this respect, it is important to differentiate the various disciplines and categories of science, both at the horizontal and vertical level, in order to be able to deal more effectively with the problem. And this was precisely one of the more important aspects of the Cologne workshop, in that the presentations dealt with the various disciplines of science: physics, chemistry, biology, astronomy... as well as with non-formal, basic, secondary, tertiary education and research and employment issues. Again, thanks to the constant and active presence of schoolchildren – girls and boys – throughout the workshop, it was possible for the participants to personally gauge the reactions of those who were most concerned by the subject of the workshop. Indeed, in the majority of meetings on STE for children and youth, the true subject, the pupils, are most noticeable by

\* The objective of this project is to promote experimental teaching of science as a way of improving scientific education in the school, to "take" hands-on experiment active learning into the classroom. The H-Sci network of twenty-eight institutions from ten European countries and a trans-national consortium (CoLoS) is inscribed on the COMENIUS 3' "Science and Technology" thematic area. The duration of the project is three years. (<http://www.uminho.pt> (v. p. 14)

their absence, or at very best by their presence as mere figures in various types of statistics formulated and compiled by - adults!  
Thus, the workshop participants were able to witness girls managing a variety of technical appliances generally handled

by boys not only in their normal school routine but also in the course of the workshop. Moreover, throughout the workshop it was possible to engage in a dialogue with girls and boys to judge of their reactions to the various initiatives that were being undertaken by their

educational system – a welcome change from the run-of-the-mill workshops. A website has specially been created for the results and all information concerning this workshop at the following address: <http://www.comenius.kbs-koeln.de/home.htm>

## The ODYSSEUM KÖLN:

### Life, Knowledge, Future

Cologne, Germany

*A new centre of knowledge experience is being constructed in Cologne, Germany, dealing with scientific innovation and the future of mankind. Named after Homer's "Odyssey" which recounts the complex development of an individual, the construction of the Cologne Odysseum in the heart of one of Europe's regions most active in research is characteristic of a modern, knowledge-based society.*

*The Odysseum aims to cover not only specific scientific disciplines but also pose fundamental questions such as: Is technology the solution? Where are informatics and biotechnology leading us? Is violence unavoidable? Is sustainable development really possible? The scientifically researched topics of societal relevance presented in the Odysseum will offer teachers and educators unique knowledge building opportunities both for themselves as well as for their students.*

*It focuses, on the one hand, on the potential of science and technology to change our lives and, on the other, on the ways and means in which it can be harnessed for the benefit of society.*

*Additionally, it will allow the visitor to experience 4 million years of human evolution from fragile hominids to masters of the earth: an Odyssey with an end that we are all in search of in an increasingly complex world. It will treat of 14 topics grouped as under:*

1. **Orientation:** Originality of mankind; Knowledge and Cognition; Sustainable Development in the 21st Century
2. **Life:** Information as the basis of life; Biological evolution; Nervous system and the brain
3. **Technical information processing:** Computers; Telecommunication & Networking; Robotics
4. **Life and survival:** Nutrition and Water; Health: Modern and other medicines; Genetics and Biotechnology in agriculture; Genetics and medicine

*The Cologne Odysseum aims to be an open platform for knowledge dissemination and dialogue within the society. Thus, a broad spectrum of scientific, technical and social topics will be entrusted to concerned groups and actors in the presentation and communication processes. This can also be seen on the Odysseum website "Life, Knowledge, Future" ([www.odysseum.de](http://www.odysseum.de)) and in the planned Odysseum Club.*

*The Odysseum aims to build a worldwide network with similar minded institutions in order to broaden the scope of its contents. And the search for partners and sponsors is already underway in order to further extend the digital capacity of its knowledge systems.*

Further information from:

SK-Stiftung CSC - Cologne Science Center,  
c/o Stadtparkasse Köln  
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50667 Köln, Germany

or

Forschungsinstitut für Anwendungsorientierte Wissensverarbeitung (FAW)  
Armin Frey (Projektleiter)  
Helmholtzstraße 16  
89081 Ulm, Germany



## SMASSE\* Project Activities in Africa

**S**URVEYS carried out in Africa indicate that the teaching of science and mathematics is faced with various problems, the major ones being:

1. Attitudinal factors among students, teachers and stakeholders
2. Poor teaching methodology whereby most teaching is teacher centred
3. Poor mastery of subject content among teachers
4. Lack of professional, interactive fora for teachers
5. Inadequate teaching/learning materials
6. Administrative factors

To address these issues, the SMASSE Project has established a system of INSET (in-service education and training) for practising teachers of mathematics and science. It also holds training workshops for key science and technology officers in the Ministry of Education including school inspectors, district education officers and school principals and supports student congresses on mathematics, science and technology together with subject associations.

The SMASSE Project has also spearheaded the establishment of SMASSE-Western, Eastern, Central and Southern Africa Association (SMASSE –WECSA), a forum in which key educationists in mathematics and science from around Africa meet to exchange ideas. This association has so far held four regional conferences: in Kenya in February 2001 and June 2002 (*v. Connect, vol. xxviii, no.1-2, 2003*), in Ghana in June 2003 with representatives from 18 countries and in South Africa in June 2004 with delegates from 22 countries.

Major resolutions which were adopted at these conferences and are currently in the process of being implemented, are the following:

- Promoting building of innovative skills through mathematics and science fairs/congresses at all levels
- Institutionalisation and regularisation at all levels of in-service training for teachers and setting up a regional modality to monitor and evaluate the impact of INSET activities as a way of strengthening networking and collaboration

- Organising more regional conferences to address issues in mathematics and science in Africa
- Encouraging teachers to adopt more innovative approaches to teaching and learning
- Establishment of a regional Mathematics and Science association and maximising the use of resources through sharing
- Establishment of gender-friendly teaching methodologies by all teachers and adoption of gender-neutral approaches by curriculum developers and producers of educational materials

The next conference will take place in Rwanda in June 2005 and is expected to attract representatives from many more countries.

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## 4th International 5-a-day Symposium

Christchurch, New Zealand, 9-10 August 2004

**A**T least 2.7 million deaths/year globally can be attributed to low fruit and vegetable intake according to *The World Health Report 2002*. Chronic diseases now make up 60% of deaths and 49% of the global disease burden. Already, 79% of these diseases are occurring in developing countries. In addition, globally there are more than one billion adults overweight at least 300 million of them obese. There are an estimated 171 million people with diabetes worldwide, a figure likely to double by 2030. In developing countries the number of people with diabe-

tes is expected to increase by 150% in the next 25 years.

In response to these alarming statistics, the World Health Organization (WHO) and the Produce for Better Health Foundation (PBH) co-sponsored *The 4th International 5 A Day Symposium* held in Christchurch, New Zealand, 9-10 August 2004.

The symposium brought together health professionals, nongovernmental organizations, retailers and producer industry representatives together to strengthen initiatives worldwide to increase fruit and vegetable consump-

tion. Key issues included the need for effective programmes to address the international epidemic of overweight and obesity, and strengthening public-private partnerships to promote fruit and vegetables.

For further information contact:

Dr Robert Beaglehole, Director, Chronic Diseases and Health Promotion  
or Ms Ingrid Keller, Focal Point, Fruit and Vegetable Initiative (E-mail: kelleri@who.int), WHO, Geneva, Switzerland. <[www.who.int/dietphysicalactivity/fruit](http://www.who.int/dietphysicalactivity/fruit)>

\* Strengthening of Mathematics and Science in Secondary Education Project (*v. Connect, vol. xxv, no. 1, 2000*)

# STEE Centres, Associations, Networks ...

## Hands-On Science (H-Sci) Network

A European Union Socrates/Comenius 3 Initiative

THE challenges that Europe faces in these times of enlargement, consolidation and global affirmation of the European Union (EU) in the world, make education and particularly science and technology education particularly important.

The Hands-on-Science (H-Sci) network, which is inscribed in the COMENIUS 3': "Science and Technology" thematic area, is a 3-year project with a broad field of intervention. It aims to promote and diffuse among schoolteachers, schools, and national and transnational educational boards, well established practices of hands-on, experimental teaching in all science disciplines. The main goal is the promotion of experimental teaching of science as a way of improving scientific education in the school, to take hands-on, experiment active learning into the classroom.

A task force has been established to pursue a major public relations effort approaching teachers and educators, schools, Ministries of Education and education bodies, in a systematic attempt to prove and illustrate the benefits of an extended use of hands-on experimental learning of science.

Interactive web sites and virtual simulation tools and labs are to be established. Educational hands-on kits of experiments and support material with different levels of difficulty will be proposed, projected and discussed. Textbooks and reports with electronic interactive versions will be produced in different languages and disseminated. Changes in national science syllabuses will be discussed and proposed to the proper authorities. International conferences and workshops will be held annually together with a significant number of courses for school-

teachers as well as science contests and activities for school students.

It is expected that this network will serve as a starting point for the generalization of the use of active, hands-on learning of science in EU schools.

The H-Sci network comprises twenty-eight institutions from ten European countries: Belgium, Cyprus, Germany, Greece, Malta, Portugal, Romania, Slovenia, Spain and UK as well as a transnational consortium (CoLoS). It is coordinated by the Universidade do Minho, Portugal.

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*http://www.uminho.pt*

## Science and Technology Indicators for the European Research Area

(STI-ERA)

The idea of a European Research Area (ERA) grew out of the realisation that research in Europe suffers from three weaknesses: insufficient funding, lack of an environment to stimulate research and exploit results, the fragmented nature of activities and the dispersal of resources.

The objective of the European Research Area initiative combines three related and complementary concepts:

- the creation of an "internal market" in research, an area of free movement of knowledge, researchers and technology with the aim of increasing cooperation, stimulating competition and achieving a better allocation of resources;
- a restructuring of the European

research fabric, in particular by improved coordination of national research activities and policies, which account for most of the research carried out and financed in Europe;

- the development of a European research policy which not only addresses the funding of research activities, but also takes account of all relevant aspects of other EU and national policies.

Among the various activities of the ERA are included notably: Benchmarking, Mapping of excellence, Science and society, S&T Foresight and S&T Indicators. The ERA website focusing on S&T Indicators (STI-ERA) includes current publications about indicators, ongoing projects on the development of new

indicators, calls for proposals and studies, links to databases etc. for 15 EU Member States\*, the US and Japan.

Most of STI-ERA indicators are developed by the DG Research unit "Competitiveness, Economic Analysis and Indicators". The raw data necessary for these indicators are collected by Eurostat (Statistical Office of the European Union) from the National Statistical Offices and provided to the unit for development and calculation, in collaboration with Eurostat.

Further information from: <http://www.cordis.lu/indicators/>

\* Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Sweden and U.K.



## Science & Technology Foresight Center

### Japan

THE Science & Technology Foresight Center (STFC) was established in 2001 by the National Institute of Science and Technology Policy (NISTEP) of the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT). The mission of the Center is to support national science and technology (S&T) policy by providing policy makers with timely and comprehensive information on important science and technology issues in Japan and the rest of the world.

STFC conducts regular surveys by means of its experts network system which counts over 3,000 experts in the industrial, academic and public sectors. It also publishes a monthly Science and Technology Trends in Japanese consisting of two parts: one dedicated to the latest issues in life sciences, ICT, environment, etc. and the other to insight analysis covering not only technological trends in specific areas but also other issues including Japanese research &

development and S&T policies in the rest of the world.

The work of SFTC focuses on the following fields:

- Life Sciences
- Information and Communication Technologies
- Environmental Sciences
- Nanotechnology
- Energy
- Manufacturing Technology
- Infrastructures
- Science & Technology Policy

Its major activities are the following:

- *Collection and analysis of information on S&T trends by means of an experts network*

For this SFTC relies on its network and reports the collected information to MEXT and the Council for S&T Policy, Cabinet Office (CSTP).

- *Research on trends in major S&T fields*

SFTC targets areas vital for progress in S&T, analyses the trends and helps

administrative departments set priorities in policy formulation.

- *Technology foresight and S&T benchmarking survey*

With the help of experts in the relevant fields, SFTC conducts a technology foresight survey every 5 years to grasp the direction of technological development in the coming 30 years. It benchmarks Japan's current and future position in key technologies of various fields with regard to that of the US and major European nations. The results are published in NISTEP reports.

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<http://www.nistep.go.jp/index-e.html>

## Fondation Rubisadt

### Cameroon

FOUNDATION Rubisadt is a non-profit, non-governmental organisation dedicated to promoting novel, holistic approaches to gender in STE. It was established in 2001 by Dr Florence TOBO-LOBE, a Cameroonian trained in the US and France, notably to remedy the flagrant inequality between boys and girls in the field of education that has serious consequences on the Cameroonian society.

Based at Douala, the economic capital of Cameroon, the Foundation is staffed by men and women sharing the same ideals as its founder and dedicated to making all efforts to attain them. The rationale for its establishment was the state of education and notably that of girls in Africa in general and Cameroon

in particular. Indeed, the African continent, plagued by successive economic crises and armed conflicts, is today in a generalised state of extreme poverty resulting in the loss of ethical values dictated by the incessant struggle for survival.

In the Cameroonian educational context, the collapse of the general educational system is further accentuated by low school enrolment rates of girls. The latter is a major factor for the drastically low rate of access of women to S&T careers. National as well as international surveys officially testify to flagrant practices of gender discrimination at all levels: whether it is with regard to access to education, school drop outs, decision making or social

leadership. It is well known that in Africa a great number of girls are kept away from the latter sectors due to cultural, social and economic reasons, resulting in very low female representation in posts of responsibility.

And yet, neither in Africa, Cameroon nor any part of the world, can there be development without the participation of those – men and women - who can actively contribute through their education, knowledge and commitment to the general interest, to building a better future.

The Fondation Rubisadt is thus dedicated to achieving the following objectives:

- Helping to reduce the school drop-out rate of girls

- Helping girls to acquire and develop self-confidence, self-respect and self-understanding in order to perceive and confront the challenges and problems of their environment and take constructive initiatives
- Setting up a research centre focusing on gender-specific trans-cultural problems related to the acquisition of a sound STE
- Establishing partnership with at least 5 major international educational institutions

At the Foundation, motivated secondary and high school girls are given free personal tuitions with up-to-date tools and teaching methods to help them accede to tertiary level STE. This original work in no way claims to substitute the existing formal education system. It is

meant to bolster female excellence in S&T with support from public institutions, national and international private enterprise.

Its work is focused on three main programmes:

1. Creating future female leaders by providing adequate training to young girls in S&T as well as providing teacher training and encouraging research and development
2. Setting up a centre of excellence based on a resource centre, capacity building and an exchange programme
3. Establishing a Rubisadt Institute, notably through the construction of a school using the best educational methodologies

The Fondation's academic staff consists of 12 secondary level teachers as well as educational advisers who dispense annually a total of 1400 teaching/hrs. It has established contacts with various Cameroonian institutions dealing with school education, notably the Gender Committee of the Cameroonian Ministry of Education, Ministries of Finance and Urbanism as well as the Cité de la Science et de l'Industrie and Paris VIII University (France), and the Somerset MicroScience Laboratory, South Africa.

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## U Marinu

France

U Marinu, located in Corsica, a Mediterranean island, is a French association devoted to environmental education. It is a member of the Comité 21 France, the CPIE (Permanent Centre of Environmental Initiatives) as well as of UNESCO's Associated Schools Project. The overall objective of U Marinu is to educate the children of the Mediterranean to become responsible adults in matters concerning their sea: whether in the matter of ecological threats, the plurality of cultures in each society and the need to develop inter-cultural dialogue in order to contribute to a culture of peace.

U Marinu aims to promote the Mediterranean as an eco-cultural region with an identity and a common history which consists not only of cooperation and conflict but also of fundamental elements of one culture. This culture, though complex, has to be apprehended through a multidimensional intellectual approach. From a simple geographical concept, the Mediterranean has evolved to become the source of a sense of belonging to a cultural community. It is thus impor-

tant that the inhabitants of this region – young and old – be made aware that this sense of belonging is part of their identity. The Mediterranean sea is like a laboratory of the world in the making: faced with 21st Century issues such as overpopulation, opposition between rich and poor countries, fundamentalism and all forms of pollution. For this reason, U Marinu feels itself totally committed to the action of the DESD.

For the past 11 years, U Marinu, in collaboration with numerous local and regional associations, has been organising an annual Sea Festival (Mer en fête) which has led to cooperation among several countries bordering the Mediterranean: Algeria, France, Italy, Lebanon, Morocco, Romania, Spain and Tunisia. The 2004 Sea Festival was held in Alger and Tunis and in 2005 it will be held in Athens, Barcelona, Beirut, Constanza and Tangiers. The festival involves participation of school children as well as formal and specially nonformal educational associations, the latter having great importance in countries of the South.

Since the sixth Sea Festival, the participating teachers, actors and research workers meet periodically to exchange experiences and reflect on issues related to culture, environment and sustainable development. The first meeting, sponsored by UNESCO, was organised in Bastia, France, in 1999 and focused on "Training for Eco-citizenship". In 2000, in Tunis, the chosen theme was "Education for a Sustainable Future around the Mediterranean as a contribution to a Culture of Peace". In 2002, U Marinu organised in Tangiers, Morocco, "The Second Transdisciplinary Meeting on Education for Sustainability in the Mediterranean Region" in collaboration with UNESCO.

The Association would welcome contact from those interested in establishing a dialogue on the Mediterranean region.

Further information from:  
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## Kids and Science Foundation:

*stimulating a positive awareness in young people for science and technology*

**K***IDS and Science* is about helping young people see, understand and enjoy the science around them in everyday life. It is also about young people making things better, even inventing things, because being kids they think like kids. The Foundation challenges them to "look around you, at all the things in your normal life, and think about ways to make something better".

The Foundation has four goals:

- ▶ help young people discover the relevance and enjoyment of science and technology in their everyday lives;
- ▶ show them that science and technology are essential for the future development of all sectors of society;
- ▶ bring these messages to young people at an age when they are beginning to make school choice and career decisions, and where a career involving science and technology might become an attractive possibility;
- ▶ lay the foundations for a society where the citizens understand and appreciate the need for science and technology.

*Kids and Science* began as a project supported by the European Commission to show young people that science and technology are relevant and essential to their everyday lives and also a lot of fun. The 2003 program saw the first Science Village in Moenichkirchen (Austria) and the development of the *Kids and Science* website.

Building on the success of the 2003 programme, *Kids and Science* is developing school projects and Science Villages across Europe (2004-5) and building an international network to link young people globally.

The *Kids and Science Foundation* works with young people in the following manner:

- **Science Villages**

In the Science Village, young people come together and spend one week with scientists to discover the enjoyment of science and technology. It is here that they generate and develop their ideas as individuals and in teams. The Village staff consists of students with a wide range of pedagogical and scientific expertise who work closely with the young people. Mornings are devoted to workshops, the afternoons to games and challenges based on science and technology, while in the evenings the focus is on communication and adventures where the young people play the leading roles.

Science Villages are intense, packed with activities and highly successful in motivating young people who in turn motivate and interest their friends. Selection for participation is largely done by the teachers who run *Kids and Science* school projects during the academic year.

- **"My Better World" school projects**

These projects unleash the energy and creativity of young people to develop their own ideas to improve the world around them. Working in teams, they combine their individual talents to achieve goals following the rules applied in normal business environments. This also means contact with scientists in companies and organizations who help them understand problems and opportunities and how to make good decisions.

In pedagogical terms, young people learn the benefits of working

together as well as how to think while relying on their own initiative and strength. This allows them to discover that ideas in science and technology transcend most of the differences that separate people.

- **The Virtual Science City**

([www.kidsandscience.org](http://www.kidsandscience.org))

The Virtual Science City is a website where young people can report on their projects, exchange ideas and experiences, as well as ask for help (and get it). There are seven districts in the Virtual Science City which represent what young people see in their everyday lives – water, air, energy, life, food, materials and transport. Each district has a metro-system on which the young people can travel and where they can build metro stations on topics that interest them.

The Virtual Science City belongs to the young people. They continue to build it by writing about what really matters to them. It is also a place for communication between young people worldwide. In the Forum, they post items and respond on issues they consider important in their lives. Above all, the Virtual Science City provides the essential continuity for young people to maintain enthusiasm and momentum.

Take time to look more closely at *Kids and Science* and how it could work in your country. The *Kids and Science Foundation* will be pleased to help you set up local programmes.

Contact Information:

Dick Wife

*Kids and Science Project Coordinator*

Nieuwe Parklaan 24

2597 LD The Hague

The Netherlands

email: [dickwife@compuserve.com](mailto:dickwife@compuserve.com)

## Pequeños Científicos (Young scientists)

Venezuela

**P**EUQUEÑOS Científicos is a non-governmental organisation, established on the model of the French association *Les Petits Débrouillards* by a group of young professionals concerned by current environmental issues and convinced of the importance of developing science and culture for all human beings. Its nature is scientific/environmental and it operates on a national and international level, defending and disseminating the fundamental principles of science and environmental education to ensure a better world.

The fundamental aim of Pequeños Científicos is to promote the development of a social conscience in line with the values of environmental conservation and sustainable development, science popularisation and cultural safeguard.

Its objectives are the following:

- Developing training activities for the defence and conservation of the environment, dissemination of science and safeguard of culture
- Organising and participating in meetings, festivals, exhibitions and public events which are in line with the aims

of the association

- Disseminating information related to the environment, science and culture by means of all types of media: print, audio-visual or other
- Establishing working relationships with other organisations/experts for developing cultural, scientific and environmental projects
- Promoting research as well as capacity building of individuals, communities and organisations in the fields of scientific, environmental and cultural education
- Fostering the creation and consolidation of environmental, cultural and scientific groups in communities

Its programme is centred on four major actions:

1. **Eco-schools:** Directed at schools, the aim of this activity is to provide participants with the necessary tools to foster pro-environmental attitudes
2. **Popularisation of Culture:** which consists of promoting an awareness of national identity through various manifestations devoted to dance, music, games, etc.
3. **Science popularisation:** whose

aim is to transmit principles of experimental science to children, youths and teachers in a practical, accessible and ludic manner

4. **Eco-community:** which involves organisation of workshops for communities with the aim of providing them with the tools that allow them to live in a healthy environment.

Apart from these activities Pequeños Científicos also organises workshops directed specifically at children, youths and educators on popularisation of culture, environmental education and sciences. Each month the organisation publishes an article on an issue of current interest on its website : <http://www.pequenoscientificos.net>

Further information from:

*Pequeños Científicos,*  
*Urb. Los Chaguaramos,*  
*Calle Bellas Artes ent.*  
*Av. Facultad y Las Ciencias*  
*Qta. Campi, Piso 1 Apto. 3*  
*Caracas, Venezuela*  
*Fax: (0058)-212-693-89-29*  
*E-mail:*  
*pequenoscientificos*  
*@pequenoscientificos.net*

## Canadian Academy of Travel & Tourism

The 21st Century brings challenges and opportunities presented by a global marketplace, created by technological progress and the removal of trade barriers. Educational systems must provide student populations with the tools, knowledge, skills and attitudes necessary to succeed in the new environment. With the support and guidance of education and industry partnership, the Canadian Academy of Travel & Tourism (CATT) was established in 1995 to address these concerns in the travel and tourism industry.

The Academy mission is to introduce and promote careers in the tourism industry while students pursue their high school diplomas. The knowledge of global travel and tourism conditions and trends has to be complemented by relevant skills and attitudes provided by high school education.

The 21st Century brings challenges and opportunities presented by a global marketplace, created by technological progress and the removal of trade barriers. Educational systems must provide student populations with the tools,



Academy students demonstrate learning outcomes referenced to the National Occupational Standards for Transferable Skills established by the Canadian Tourism Human Resource Council and the Employability Skills 2000+ assembled by the Conference Board of Canada.

The CATT program and affiliates involve high school students in grades 10, 11 and 12. These students follow the regular curriculum with a "specialization" in tourism. Many academic and experiential projects associated with the regular curriculum are tourism related. Canadian high schools can be involved in the Academy program at different levels.

At the Global Travel & Tourism Student Conference held in Frankfurt, Germany, in November 2003 two Canadian Academy of Travel & Tourism students demonstrated research and leadership skills in their sustainable tourism case study on «Mount Robson» which is part of the UNESCO Rocky Mountain Heritage Site. (Several case studies on world national parks and tourism are featured on [http://www.gttp.org/html/student\\_cases.html](http://www.gttp.org/html/student_cases.html))

Currently, there are 20 Academy High School programs operating in 8 provinces of Canada. Tourism industry work placements and internships are organized for Academy students by teachers and an industry advisory group.

For further information contact:  
*Bonnie Stevens, Executive Director,*  
*Canadian Academy of Travel & Tourism,*  
*340 MacLaren Street, Suite 100, Ottawa,*  
*Ontario K2P 0M6, Canada.*  
*E-mail: [bstevens@cthrc.ca](mailto:bstevens@cthrc.ca)*  
*[www.cthrc.ca/careerplan\\_catt.shtml](http://www.cthrc.ca/careerplan_catt.shtml)*

## Doing it & Telling it

### Knowing and Living the Earth Charter

Majorca, Spain

**Place:** The activity was carried out at the Public School Blanquerna located in Marratxí (Majorca)

**Target Groups:** The activity targeted elementary and primary school pupils (grade 6). It was also developed in the compensatory and reinforcement classes for students with difficulties.

**Introduction:** Because Majorca is an island with immigrants from many countries and continents, in the 2003–2004 school year, a project to work on the Children's Earth Charter by means of a photographic workshop was developed. The project, entitled «Know and live the Earth Charter», targeted sixty pupils who worked on the text of the Earth Charter in a global form in three separate courses:

- Languages: (Catalan, Castilian Spanish and English)
- Environment Knowledge
- Artistic Education

**Objectives:** The primary objective was to personalize the ethical principles of the Earth Charter and bring home to the children the fact that we are world citizens, that inter-culturality is a positive thing and that education leads us to work for peace and cooperation all over the world, starting from place where we live.

**Resources:** The resources consisted of the normal materials and funds provided by the school.

**Methodology:** The primary objective of the project being the understanding of the ethical principles of the Earth Charter through personal ownership, each pupil:

- took photos and commented upon the people, plants, animals and things that spoke to him directly of the values contained in the Children's Earth Charter;
- made a personal file with his/her own notes, drawings, surveys, letters, magazine extracts; and based on the photographs that he/she had taken:
- learned to make his/her personal book, 'plastifying' and binding texts and other work (three books have been left behind in the school as a testimony of the project).

**Evaluation:** The activity was judged very positively by the children, their parents and the teachers. Although the photos taken by the children were of varying quality - good and bad – they clearly express the children’s hopes and belief in the future.

**Results:** The most important result was the awareness created in the children that we are citizens of the world and that they, from Majorca, can help to improve the Earth, that is our common home. Moreover, it helped build a high degree of self-esteem in the participating children.

The activity also served throughout the school year as a catalyst for a pen-pal project (through postal and electronic correspondence) on the same theme, involving seven schools from Australia, Brazil, Canada, Colombia, Romania, Rwanda and Senegal. Besides creating links among children from the various countries, it was an excellent example of integration of pupils from different horizons.

**Sent by:** Guillem Ramis i Moneñy, Ca'n Pèl, 8, 07009 Es Pla de na Tesa, Mallorca, Spain. E-mail: [guiramis@terra.es](mailto:guiramis@terra.es)

*Readers are invited to send us their **FIELD experiences in Science, Technology, Environmental Education activities** involving the teaching/learning process - but not necessarily limited to students and teachers. They should be **as brief as possible** and set under the following headings:*

**Place:** Locality where the activity was carried out

**Target Groups:** For whom the activity was intended

**Introduction:** Background information - reasons for initiating the activity

**Objectives:** What was the activity expected to achieve?

**Resources:** Materials/funds needed for the activity

**Methodology:** The way in which the activity was carried out

**Evaluation:** How was the activity judged? By whom?

**Results:** Did the activity produce any concrete changes in the target group(s)?

*Selected experiences will be published with the name and address of the author. Please address your contributions to:*

**Doing it and Telling it** (address on last page)

## News & Publications

### DESD News



Following the International Launch of the Decade of Education for Sustainable Development (DESD), many countries have expressed interest in a national launch of the DESD. This will probably take place some time in April-May 2005, to give time to organize these national events worldwide. As UNESCO is being requested by countries for guidance, UNESCO held a meeting on 29-30 June 2004 in order to develop a 4-5 page "guidance" document including suggestions that have been already sent to UNESCO by many countries. The draft of the "guidance" document is being circulated, including through the DESD website, for further ideas and comments before being finalised.

Further information from: *Education for Sustainable Development, UNESCO EDIPEQ/ESD, 7 Place de Fontenoy, 75352 Paris 07 SP, France. E-mail: [esddecade@unesco.org](mailto:esddecade@unesco.org)  
[http://portal.unesco.org/education/en/ev.php-URL\\_ID=27234&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/education/en/ev.php-URL_ID=27234&URL_DO=DO_TOPIC&URL_SECTION=201.html)*



## World Earth Festival

([www.festivaldelaterre.org](http://www.festivaldelaterre.org))

The French Association TERRALLIANCE will organise the 1st World Earth Festival in June 2005.

The Festival will comprise 2 main events:

1. A charity cruise with 5 fleets of sailboats connecting the 5 continents in order to create a symbolic ring around the planet to focus world awareness on environmental emergencies
2. The Festival Week from 20 - 26 June 2005, each day focusing on a specific theme (solidarity, respect for the planet, global concert for the Earth)

The Festival aims to:

- \* raise awareness among citizens and politicians about sustainable development
- \* allow emergence of alternative solutions
- \* create worldwide networks of solidarity

In France the Festival will be supported by UNESCO and national ministries as well as regional, county and town administrations, NGOs and schools. Various personalities and associations committed to preserving the planet and to worldwide solidarity are members of the support committee.

The Festival website will gather a number of initiatives in favor of the planet and sustainable development and create bonds between the various organizations throughout the world. TERRALLIANCE is looking for local partners for co-organizing the Festival in each country of the world to federate the local events of the Festival. It would welcome receiving names of associations committed to the preservation of the planet and international solidarity likely to organize the Festival in their country.

For more information contact:

Mr Pierre LARONDE, Association TERRALLIANCE, E-mail: [terralliance@wanadoo.fr](mailto:terralliance@wanadoo.fr) Tel : 33.1.49.77.71.30

Vitamin A deficiency, which affects over 250 million under-5s in the world, is today the primary cause of avoidable blindness. To combat this, the French national **Institut de Recherche et Développement (IRD)** conducted an impact study from 1999-2001 on diet diversification based on the use of local resources in Burkina Faso. Two years after the introduction of red palm (*Elaeis guinensis*) oil in the diet, it was observed that voluntary consumption of this oil had substantially reduced Vitamin A deficiency both in children and mothers. Possibilities are being studied for wider information, commercialisation and for introducing this oil in school canteens. Further information from: Francis Delpeuch ([delpeuch@ird.fr](mailto:delpeuch@ird.fr)), IRD, 213, rue La Fayette, 75480 Paris cedex 10, France.

The **World Health Organization's (WHO)** has launched a new programme to train the next generation of health leaders. A grant of US\$ 5 million from the Bill & Melinda Gates Foundation provides funding for this programme over four years. Through the Health Leadership Service, outstanding young health professionals will be recruited

for a work and training programme, specifically aimed at strengthening the knowledge and skills essential for leadership roles in public health at all levels – national, regional and global. The programme begins on 2 February 2005 at WHO headquarters and will last for exactly two years. For further information contact: *Health Leadership Service (HLS), EIP/HRH/LMF, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland.* [http://www.who.int/health\\_leadership/apply/en/](http://www.who.int/health_leadership/apply/en/)

**Last Journey for the Leatherback?** is a 28-minute documentary film examining the threat of extinction of the ancient leatherback sea turtle by industrial longline fishing. It comes with a teacher's kit written by an experienced California public school teacher. Available to teachers for free – provided that a copy of the class activity carried out on it is sent back. For individuals and organizations the video is US\$15 postpaid. For copies contact: *Robert Ovetz, Ph.D., Save the Leatherback Campaign Coordinator, Sea Turtle Restoration Project, PO Box 400, Forest Knolls, CA 94933, USA Fax: +1 415 488 0372* [www.seaturtles.org](http://www.seaturtles.org)

## ROSE: The Relevance of Science Education (v. *Connect*, vol. xxvi, no. 3-4, 2001)

There are now 40 countries taking part in ROSE and data have been collected from about 40 000 students. A comprehensive report on the development of the project is available at the website <http://www.ils.uio.no/forskning/rose/> and is also (freely) available in print by writing to: *Svein Sjoberg <[svein.sjoberg@ils.uio.no](mailto:svein.sjoberg@ils.uio.no)>*.

A more comprehensive review and update will be presented in the coming issue of *CONNECT*.

### Financial support for MA/PhD students in Science Education for 2005

Western Michigan University (WMU) is currently accepting applications for MA/PhD in Science Education for Fall 2005.

The Science Education faculty at WMU offers a broad range of expertise including: research on teaching and learning in a specific science discipline, K-12 science curriculum & instruction, history/philosophy of science and the nature of science and science education, learning theory, socio-cultural issues and program evaluation.

WMU also offers a unique track specifically designed for the preparation of college teachers of science. This track is highly suitable for candidates interested in teaching science at a teaching intensive college or university.

Student financial support includes stipends, professional conference travel and research support. International students with strong science and English skills are welcome to apply.

For information contact: *Dr. Bill Cobern, Director, The Mallinson Institute for Science Education, Western Michigan University, 3225 Wood Hall, Kalamazoo, MI 49008-5444, USA. E-mail:sci-ed@wmich.edu <http://www.wmich.edu/science>*

## Forthcoming Conferences, Workshops, Courses...

The École Polytechnique Fédérale de Lausanne (Switzerland) and the Indian Institute of Technology Madras (India) will hold the 2nd edition of the post-graduate course on Technology & Sustainable Development – TSD entitled **“Innovative and Integrated Approaches in Emerging countries”** in Chennai, India, from **3 January – 15 April 2005**. Further information from: *IIT Madras, Environmental & Water Resources Engg division, Chennai 600 036, India. E-mail: mohan@civil.iitm.emet.in or EPF Lausanne –ISTE/HYDRAM, Inst. of Environmental Science & Technology, ENAC, Bât GR, 1015 Lausanne, Switzerland. E-mail: tsd@epfl.ch*

### The European Forum on Science & Society 2005:

A major European debate on the future role of science in society, and of society in science organised by the European Commission, DG Research, in Brussels, Belgium, **9-11 March 2005**. For information contact: *Martine Devalck, European Commission - DG Research , RTD/ Directorate C - Science and Society, Unit C.1 - Strategy and Policy, Office SDME 4/04 - B-1049 Brussels, Belgium. E-mail: Martine.Devalck@cec.eu.int*

**IV International Congress of Valeologists**, will be held in St. Petersburg, Russia, **19-21 April 2005**. Contact: *Prof. Vladimir V. Kolbanov, Department of Valeology, St. Petersburg Academy of Postgraduate Pedagogical Education h. 11, Lomonosova st., St. Petersburg 191002, Russia. E-mail: k224@inbox.ru or kolbanov@atlant.ru*

Smithsonian Institution's Monitoring and Assessment of Biodiversity Program have announced two courses to be held at Front Royal, Virginia, USA, : **Biodiversity and Monitoring Course , 8 May – 10 June 2005 and The Smithsonian Environmental Leadership Course, 11-3 September 2005**. More information from: *Smithsonian Institution, MAB Training Program, PO Box 37012, Attn: MRC 705, Washington DC 20013-7012, USA. E-mail:ohm@ic.si.edu [www.si.edu/simab](http://www.si.edu/simab)*

**Fourth International Symposium on Non-CO2 Greenhouse Gases (NCGG-4) Science, Control, Policy and Implementation** organised by the VVM/CLAN section for Clean Air in the Netherlands. Utrecht, Netherlands, **4-6 July 2005**. Further information from: *VVM, P.O. Box 2195, NL-5202 CD DEN BOSCH, The Netherlands. Fax:+31 736216985. <http://www.ncgg4.nl>*

The Eighth Conference of the International History, Philosophy and Science Teaching Group will be held in Leeds, U.K. from **15-18 July 2005**. Participants include scientists, historians, educators, philosophers, mathematicians and cognitive scientists. **Deadline for submission of 500 word Abstracts: end January 2005** (email : [ihpst2005@blueyonder.co.uk](mailto:ihpst2005@blueyonder.co.uk)). Further information from: *[www.ihpst.org](http://www.ihpst.org) or Mick Nott, Conference Secretary, (ihpst2005@blueyonder.co.uk)*



**EarthCorps International**, a non-profit, hands-on NGO working locally to solve global environmental issues organizes a 6-month free training course, the EarthCorps (EC) program, in Seattle, Washington, USA, that brings together young representatives (18-25 years of age) of international organizations to learn the basic fundamentals of environmental restoration, community organizing, stream restoration and hiking trail construction. EarthCorps training is ideal for any individual who works with the environment and is involved with community empowerment, erosion control, reforestation, ecotourism development, youth outreach, and/or the development of environmentally friendly sustainable livelihoods.

The EarthCorps program not only charges no fees for its services but in fact supplies insurance, individual home stays, gear and a monthly stipend for all international participants. The only expenses for the individuals themselves are the visa processing fees and travel fare to and from their respective countries. Airfare reimbursement scholarships of up to 30% of participants' transportation costs (max. \$500) may be available. EarthCorps provides additional support in acquiring US visas by providing letters of recommendation on behalf of EarthCorps to program participants.

Participants must speak English, have an interest in outdoor, physical work and be open-minded to other cultures.

Further information from: *Mark E. Howard, EarthCorps International Coordinator, 6310 NE 74th Street, Suite 201E, Seattle, WA 98115, USA. Fax:206-322-9312 E-mail:mark@earthcorps.org - www.earthcorps.org*

## Publications

### ESD Information Briefs

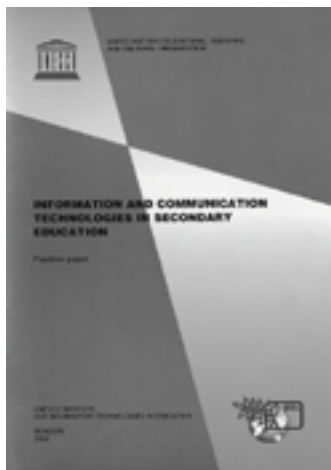
As part of UNESCO's efforts to clarify and communicate the key concepts and messages of Education for Sustainable Development, a collection of *ESD information briefs* has been created.

The collection provides analysis on several issues including:

- *The World Summit on Sustainable Development: Reaffirming a Common Goal*
- *The Evolving Concept of Sustainable Development*
- *Education for Sustainable Development and Transdisciplinarity: an Instrument for Action*
- *United Nations Decade on Education for Sustainable Development 2005-2014*
- *Partnerships for ESD*
- *Small Island Developing States*
- Cross-cutting themes related to ESD: *Agriculture, Biodiversity, Gender, Health, Poverty and Water.*

Additional briefs will be created in the coming months.

For further information: *Education for Sustainable Development, UNESCO ED/PEQ/ESD, 7 Place de Fontenoy, 75352 Paris 07 SP, France. E-mail: esddecade@unesco.org www.unesco.org/education/desdS*



**Information and Communication Technologies in Secondary Education** (2004, 24 p.). This position paper prepared by the UNESCO Institute for Information Technologies in Education (IITE), Moscow, in collaboration with the Section for General Secondary Education, UNESCO, Paris, treats of an increasingly relevant aspect of present and

future education: the use of ICTs as a pedagogical support for educators and a tool for the acquisition of knowledge and skills for children and youths. It discusses national education policies in the context of society development taking into consideration the ethical, psychological and legal issues; teaching and learning for the information society; the role of ICTs in secondary education as well as in the quality of education; and UNESCO actions to provide quality ICT usage in education. For further information contact: UNESCO/IITE, 8 Kedrova St. (Bld3), Moscow, 117292, Russian Federation. Fax: 7-095-129.1225. E-mail: info@iite.ru <http://www.iite-unesco.org>



**Science and Innovation Policy: Key challenges and opportunities** (62 p., 2004). This report draws on the results of the OECD's work on S&T to provide a basis for discussions at its January 2004 meeting (see above). It concludes that in order to ensure that S&T continue to provide solutions to economic, health and environmental challenges, OECD gov-

ernments must notably: improve public research and facilitate its translation into commercial realities; enhance incentives for business R&D; foster closer interaction between universities, government laboratories, firms and civil society; encourage the development of human resources in S&T and intellectual property rights (IPR) regimes that reward investments in innovation while encouraging the dissemination of scientific and technological knowledge. For copies contact: Editions de l'OCDE (address above).



The **Science and Technology Statistics Compendium** (52 p., 2004) was prepared for the OECD (Organisation for Economic Cooperation and Development) Meeting of the Committee for Scientific and Technological Policy (CSTP) at Ministerial level, 29-30 January 2004. It presents a wide selection of the most policy-relevant and internationally comparable indicators currently available in the field of science and technology in the OECD

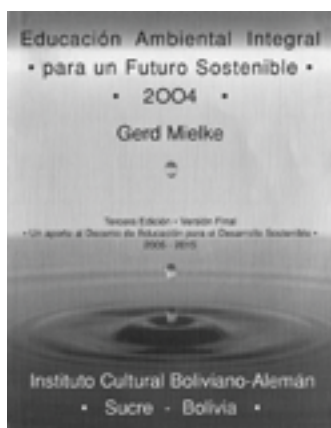
countries. The four major axes through which this is presented are: Innovation and R&D; Human resources for science and technology (S&T); Patents and Other domains (ITC, globalization, industrial structures). For copies contact: Editions de l'OCDE, 2, rue André Pascal, 75775 Paris Cedex 16, France.



**The state of science in Africa: an overview** (35p., 2002) by Roland Waast is part of the "Studies" series supported by the French Ministry of External Affairs and the European Commission. Based on the work done by a consortium of some 20 mostly local research workers, it covers the following 15 countries: Algeria, Burkina Faso, Cam-

eroon, Cote d'Ivoire, Egypt, Kenya, Madagascar, Morocco, Mozambique, Nigeria, Senegal, South Africa, Tanzania, Tunisia, Zimbabwe. **Bilingual: English/French.** For copies contact: Ministère des Affaires Etrangères, DGCID, 37 Quai d'Orsay, 75007 Paris, France. (French version available at : [http://www.france.diplomatie.fr/cooperation/dgcid/publications/etudes\\_02/02/pdf/04.pdf](http://www.france.diplomatie.fr/cooperation/dgcid/publications/etudes_02/02/pdf/04.pdf))





**Educación Ambiental Integral para un Futuro Sostenible**

(Integrated Environmental Education for a Sustainable Future) (2004, 218 p.) by G. Mielke. This is the third and final version of a resource book for school level meant specifically to contribute to the Decade of Education for Sustainable Development. The

book is presented in nine parts starting with Ecology (principles, themes and application), continuing with Education (challenges, psycho-pedagogy and EE) and ending with Human ecology, Socio-environmental Degradation and Sustainable Development. **Spanish only.** For further information contact: *Instituto Cultural Boliviano-Alemán, Casilla 648, Sucre, Bolivia.* E-mail: [gmielke@mara.scr.entelnet.bo](mailto:gmielke@mara.scr.entelnet.bo) [www.icba-sucre.edu.bo](http://www.icba-sucre.edu.bo)

**Notions de culture scientifique et technologique : Concepts de base, percées historiques et conceptions fréquentes**

(Elements of scientific and technological culture: Basic concepts, historical breakthroughs and commonly held notions) (2001, 480p.) by Marcel Thouin. Contrary to other works on this topic, this publication addresses a non-specialist public. It aims to facilitate the acquisition of basic concepts of physics, chemistry, astronomy, earth sciences, biology, technology and maths without formulae or equations by presenting, for example, the nature of scientific activity seen through its historical perspective. In this manner it allows the reader to understand why at given moments of time, certain fundamental scientific laws and theories made the breakthroughs that they did. Moreover, by means of constant comparison between basic S&T principles and commonly held notions, it allows the reader to understand scientific & technological culture. **French only.** Price \$39,95. Order from: *Éditions MultiMondes, 930, rue Pouliot, Sainte-Foy (Québec) G1V 3N9 Canada.* Fax: (418) 651-6822. E-mail: [multimondes@multim.com](mailto:multimondes@multim.com)

**Modeling Theory in Science Education**

(2004, 252p.) by Ibrahim A. Halloun, is the culmination of over 20 years of work toward a pedagogical theory that promotes experiential learning of model-laden theory and inquiry in science. It is primarily intended for researchers and graduate students in science education and may serve as a major reference for in-service and pre-service science teachers. The book focuses as much on course content as on instruction and learning methodology and presents practical aspects that have repeatedly demonstrated their value in fostering meaningful and equitable learning of physics and other science disciplines at the secondary school and college lev-

els. It is presented in a way to bring to the surface various student ideas, especially those that are at odds with science and to help students mutually ascertain their ideas and regulate them in an insightful manner. Price: 95,00 €. Order from: [www.KluwerOnline.nl](http://www.KluwerOnline.nl) or <http://www.springeronline.com/sgw/cda/frontpage/0,11855,5-40410-22-33478477-0.00.html>

**Teaching Secondary Science with ICT**

(204, 192 p.) ed. R. Barton, takes a practical approach to improving science education with the use of ICT while considering the broader educational issues which inform and underpin the approach. The material is presented from a teacher's perspective, considering issues such as: selection of resources, lesson planning, impact of ICT on classroom organisation and how ICT affects assessment, thus enabling teachers to make the most effective use of the ICT tools available. Useful for all those involved in science education, it is particularly helpful to support a school science department's in-house professional development. Price: £17.99 (pb); £55 (hb) + s&h. Order from: *Marketing Dept, Open University Press, McGraw Hill House, Shoppenhangers Road, Maidenhead, Berkshire SL6 2QL, U.K.* E-mail: [enquiries@openup.co.uk](mailto:enquiries@openup.co.uk) - [www.openup.co.uk](http://www.openup.co.uk)

**Education for rural development: Towards new policy responses.**

(2003, 406 p.) coord. & ed. : D. Atchoarena, L. Gasperini. This book was prepared as the conceptual background to the Education for Rural People (ERP) Partnership Flagship initiative, launched by the Sustainable Development Department (FAO) and UNESCO during the 2002 World Summit on Sustainable Development. The initiative seeks to address rural - urban disparities which are a serious concern to governments and the international community as a whole. The book presents notably a new perspective for educational development in rural areas; reviews trends and innovations in basic education for rural children and looks at training issues and higher education strategies to foster knowledge and skills in rural societies. For further information contact: *IIEP Publications Unit, 7-9 rue Eugène Delacroix, 75116 Paris, France.* E-mail: [information@iiep.unesco.org](mailto:information@iiep.unesco.org) - [www.unesco.org/iiep](http://www.unesco.org/iiep) - [www.fao.org/sd/2002/KN1101a\\_en.htm](http://www.fao.org/sd/2002/KN1101a_en.htm)

**School Science in Africa: learning to teach, teaching to learn**

(2004, 224p.) is a teaching manual for primary and lower secondary school level that addresses the varied classroom challenges currently faced by science teachers on the continent. Developed by a pan-African team of thirteen science educators under the auspices of the African Forum for Children's Literacy in Science and Technology (AFCLIST), it is written and presented in a way that is readily accessible. Each topic is dealt with as a story taken from the author's own experiences and illustrated with cartoons. This storytelling approach-a traditional African way of passing on information-makes the ideas easy to grasp, while notes

alongside identify the key concepts. Short exercises at the end of each story encourage teachers to relate the ideas to their personal situations. Price: US\$22.00 (incl. VAT). Contact : *Dr Prem Naidoo, Director, AFCLIST, University of KwaZulu-Natal, Private Bag X54001, Durban, South Africa.* Fax: +27 31 262 8044. Email: [gobindda@ukzn.ac.za](mailto:gobindda@ukzn.ac.za)

**The World Health Report 2004 – Changing History**

calls for a comprehensive HIV/AIDS strategy that links prevention, treatment, care and long-term support. Until now, treatment has been the most neglected element in most developing countries: almost 6 million people in developing countries will die in the near future if they do not receive treatment, but only about 400,000 of them were receiving it in 2003. The report looks beyond 2005 to explain how international organizations, national governments, the private sector and communities can combine their strengths to tackle HIV/AIDS and simultaneously fortify health systems for the enduring benefit of all. Download from: <http://www.who.int/whr/2004/en/> For print version contact: *World Health Report, World Health Organization, 1211 Geneva 27, Switzerland.* Fax: (41-22) 791 4870. Email: [whr@who.int](mailto:whr@who.int)

**Inheriting the World: The Atlas of Children's Health and the Environment** (2004, 64 p.) by B. Gordon, R. Mackay, E. Rehfuess.

With colour maps and graphics, this Atlas shows the threats that children face everywhere, underscoring the impact of poverty on children's health. It articulates where and why more than 3 million children die every year due to unhealthy environments, tackling issues as diverse as the devastating and largely unknown impact of indoor air pollution, bad sanitation and complex emerging issues like climate change. Price: US\$27 (Sw. Fr. 21 for developing countries). Order from: *WHO Marketing & Dissemination, 1211 Geneva 27, Switzerland.* E-mail: [publications@who.int](mailto:publications@who.int) (online: <http://bookorders.who.int>)

**WHO Guidelines: Developing Information on Proper Use of Traditional, Complementary and Alternative Medicine** (2004, 109 p.).

These guidelines have been developed by the World Health Organization (WHO) for national health authorities to develop context specific and reliable information for consumer use of alternative medicines. Adverse drug reactions to alternative medicines have more than doubled in three years. Since traditional, complementary and alternative medicines remain largely unregulated, consumers worldwide need to be informed and given the tools to access appropriate, safe and effective treatment. The guidelines provide simple, easy to follow tips on issues to look out for and a brief checklist of basic questions which may be used to help facilitate proper use of traditional and alternative medicine. Advice is provided to government authorities on preparing easy-to-access information and on working with the mass

media to sensitize and educate the population. In addition, suggestions are given for several health system structures and processes needed to promote proper use of traditional and alternative medicines. More information from: *Daniela Bagozzi, Communications Officer, Health Technology and Pharmaceuticals, World Health Organization, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland.* E-mail: [bagozzid@who.int](mailto:bagozzid@who.int) - <http://www.who.int/medicines/library/trm/Consumer.pdf>

**All of Us, Environmental Education Dossiers No. 42,**

is devoted to environmental conflicts. In the history of mankind, conflicts have more often than not been triggered by resources - by hunger for land, fuel, water, food, etc. Food shortages can easily arise from environmental damage inflicted, for example, by global warming which threatens to aggravate the situation in some of the globe's poorest regions. Protecting the environment and protecting peace must therefore go hand in hand. It is essential to conserve the earth's resources, find alternatives to fighting over them when they are scarce - and find ways to stop the armed violence that is destroying nature - and human beings across the world. Produced by the *UNESCO Centre of Catalunya, Mallorca, 285, 08037 Barcelona, Spain.* Fax: (34) 457.58.51 <http://www.allofus.net/>

**Conceptualisation of Environmental Education**

(2003, 254 p.) by Zdravka Kostova, aims to improve EE using the principles of sustainable development. Covering a period of 30 years, it examines EE in pedagogical theory & practice; the meaning of its working concepts; its conceptual system and contextualisation and proposes an innovative EE model discussing the criteria and methods for determining its effectiveness. **In Bulgarian only.** Sales information from: *Bookshop of the Department of Information and In-service Teacher Training, Sofia University, Bul. Tsar Boris III, No. 224, Sofia 1619, Bulgaria.* E-mail: [zbkostova@yahoo.com](mailto:zbkostova@yahoo.com)

The Centre for Science and Environment (CSE) has published a series of **5 Reports on the State of India's Environment**. This series of five reports is an essential tool in raising consciousness of environmental issues, providing an analysis of the issues and problems with India's environment. It also provides an overview of the work being done by non-governmental and governmental organisations. The first deals with the relationship between development & environment; the second describes major environmental changes in India; the third treats the nature of the challenge posed by ecologically sound development; the fourth provides an overview of India's traditions of rainwater harvesting and the fifth documents initiatives in the rural sector & the crisis in the urban. For sales information contact: *Society for Environmental Communications, 41, Tughlakabad Institutional Area, New Delhi 110062, India.*



**Introduction to Environmental Engineering and Science (2nd edition)** (2004, 560 p.) by R. S. Gupta, covers the basics needed to understand technology, manage resources, control pollution and successfully comply with the regulations. Thoroughly updated and expanded, this edition features notably a new chapter on Risk and Uncertainty Analysis as well as subjects such as hydrology, soil sciences, mining as well as policies, programmes and latest status reports on key environmental issues. It begins by detailing basic scientific principles as they apply to the environment, going on to review the fundamentals of water, air and land resources, the threats they pose to the environment and the engineering solutions to each. Price US\$89 (hc). For further information contact: *Janet Wolfe, Marketing Manager, Government Institutes, Scarecrow Press, Inc, 4501 Forbes Boulevard, Suite 200, Lanham, MD 20706, USA. Fax: 1-301-429-5748 - <http://govinst.scarecrowpress.com>*

**La Lettre de l'OCIM**, no. 94, July-August 2004, focuses on the very interesting theme of reconciling scientific culture and information. **French only.** For more information contact: *OCIM, 36, Rue Chabot Charny, 21000 Dijon, France. <http://www.ocim.fr>*

**Higher Education and the Challenge of Sustainability: Problematics, Promise, and Practice** (2004, 382 p.) ed. P. B. Corcoran, A. E.J. Wals. This book provides a variety of theoretical and practical resources for all those seeking to integrate sustainability in higher education. Sustainability is not only explored as an outcome and a process of learning but also as a catalyst for educational change and institutional innovation. The book raises the various problematics related to this field and provides an intellectual history and critical assessment of the prospects for institutionalising sustainability in higher education. Price 145 / US\$160 (hb); 50 / US\$55 (pb). Order from: *Kluwer Academic Publishers, Dordrecht, Netherlands. <http://www.wkap.nl/prod/b/1-4020-2026-0>*

### International Conference BioEd 2004: Biological Education, Sustainable Development, Ethics and Citizenship

Rio de Janeiro, Brazil, 13 - 18 September 2004

*BioEd 2004, the International Conference on "Biological Education, Sustainable Development, Ethics and Citizenship", was cosponsored by the International Union of Biological Sciences (IUBS), the Oswaldo Cruz Foundation of Brazil, the International Union of Nutritional Sciences (IUNS), UNESCO and the LDES, University of Geneva. The conference aims were to:*

- *explore linkages among biological sciences, the environment, sustainable development and society;*
- *promote bio-literacy and biology education reforms that integrate biology, sustainability, health, well-being, ethics and citizenship;*
- *make recommendations for improving biology education worldwide in support of the UN Decade of Education for Sustainability, adopted for 2005-2015.*

*Its major objectives were to:*

- *prepare an agenda for biological education in sustainable development, ethics and citizenship and develop guidelines for its implementation in developed and developing countries;*
- *involve leaders in science and society in the full range of the educational enterprise, formal and informal, including public education and training;*
- *address the question of identifying essential knowledge about the environment, sustainability, health and well-being as well as the roles of science and values in education;*
- *explore and evaluate the diversity of approaches and themes;*
- *make recommendations on how to develop bio-literacy with special reference to sustainability, ethics and citizenship and disseminate the results of the conference to policy and decision-makers at national and international levels.*

*Organized in plenary and parallel sessions, there were poster and educational material exhibits as well as symposia and workshops on:*

- *Biological education, health and well-being*
- *Biological education, environment and sustainability*
- *Biological education, agriculture, nutrition and food security*
- *Biological education in the modern age of information and communication technologies*
- *Biological education, ethics and citizenship.*

*For further details, please contact: Faqir Vohra, Secretary-General, CBE-IUBS, <[efcie.vohra@wanadoo.fr](mailto:efcie.vohra@wanadoo.fr)>*

## THE ROLEX AWARDS FOR ENTERPRISE

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## Connect

Published by UNESCO

Education Sector

7, place de Fontenoy

75352 Paris 07 SP

France.

Tel: (33-1) 45.68.08.09

Fax: (33-1) 45.68.56.26

E-mail: [d.bhagwut@unesco.org](mailto:d.bhagwut@unesco.org)

ISSN 0250-4490



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