

NOVEMBER 2012

Welcome to the ICASE November 2012 Newsletter !

The ICASE Newsletter is a regularly distributed publication containing current information about topics of interest in the field of science education. The table of contents for this issue is located in the right hand column.

The International Council of Associations for Science Education (ICASE) was established in 1973 to extend and improve science education for children and young people throughout the world. Today, ICASE is a huge network of science education associations, institutions, foundations and companies, facilitating communication and cooperation at the regional and international level.



International Council of Associations for Science Education

http://www.icaseonline.net

To be included on the listserve for notification of future newsletters please follow the guidelines on www.icaseonline.net/news.html

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ICASE News



Jack Holbrook, ICASE Projects & Secondary Science Education Journal

ICASE involvement in ENGINEER Workshop, October 2012

ENGINER is a European Commission FP7 funded project enhancing the teaching of engineering ideas at the primary level (grades 4-6). It is led by ARTTIC (Israel) and ICASE is one of the 25 partners involved. The workshop explored the development of teacher modules based on an engineering design approach and incorporating the underlying science involved. Prototype materials, developed by the science museum partners, were tried out by small teams of teachers from 10 countries in the workshop. The modules and accompanying teacher manuals will be upgraded with a view to introducing the developing modules to teachers through workshops in each project country ran by the corresponding science centre.





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intended onit ropics for ENGINEER		
SCIENCE TOPIC	ENGINEERING FIELD	TECHNOLOGY
Water	Environmental	Water Filter
Insects/Plants	Agricultural	Hand Pollinator
Wind & Weather	Mechanical	Windmill
Simple Machines	Industrial	Factory Subsystem
Earth Materials	Materials	Wall
Balance & Forces	Civil	Bridge
Sound	Acoustical	Representation System
Organisms/Basic Needs	Bioengineering	Model Membrane
Electricity	Electrical	Alarm Circuit
Solids & Liquids	Chemical	Play Dough Process
Landforms	Geotechnical	Bridge Siting
Plants	Package	Plant Package
Magnetism	Transportation	Maglev System
Energy	Green	Solar Oven
Astronomy	Aerospace	Parachute
Rocks	Materials	Artifact Replica
Floating & Sinking	Ocean	Submersible
Ecosystems	Environmental	Oil Spill Remediation
Light	Optical	Lighting System
Human Body	Biomedical	Knee Brace

. . .

Each unit comprises of an engineer design cycle (standard in all modules), background science activities and the engineering challenge, undertaken by students in line with desgn cycle. After finalising the modules, training of trainers and teachers will take place and teachers then enact modules in their classrooms.

ICASE will disseminate ENGINEER and its developments in due course.



Presentation by the Chair of the ICASE Committee for Science and Technology Education Centres

An ICASE talk show on popularation of science was held in Singapore for students, in conjunction with Synergyst (<u>http://www.synergyst.com/</u>). Synergyst has worked with ICASE in the past to host regional conferences and is interested in further collaborations. Dr Janchai, the chair of the ICASE Science and Technology Centres standing committee, drin ghis visit to SIngapore held discussionse on possible initiatives.

The two-way photograph depicts Dr Janchai on stage with the audience well seated. Photograph taken at the end of October 2012.





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ICASE World Conference – call for papers

The Call for Papers is open for WorldSTE2013 and also electronic registration has now been up-loaded on the conference website (WorldSTE2013.org).

The conference is being designed to especially appeal to teachers/science educators interested in STEM, Geography and Sustainability areas. In addition, there are two adjoining conferences - Solar and Hybrid Technologies held beforehand and Safety in Science afterwards, as well as an anticipated huge exhibition area and month-long Science Festival in Kuching.



The International Council of Associations for Science Education (ICASE) are proud to be hosting The 4th World Conference on Science and Technology Education (WorldSTE2013)

> 29 September – 3 October 2013 Kuching, Borneo, Malaysia

WorldSTE2013 will bring together over 2000 participants world-wide, notably leaders in science, and technology education, universities, school laboratory technicians, students and teachers, to consider the latest research, educational developments and practical activities for science and technology education and its future directions.



REGISTRATION IS NOW OPEN!



For more information visit our website www.worldste2013.org or email us at worldste@industrygrowth.net





Education for Sustainable Development

Jack Holbrook, past President, ICASE

We are now well and truly into the latter part of the Decade for Education for Sustainable Development (ESD). What is happening? In this issue I provide aspects on the thinking behind ESD, while in the December issue the focus is more on its enactment in science teaching.

The following are extracts from the 2006 UNESCO publication – Framework for the UNDESD International Implementation Scheme.

In December 2002, the UN General Assembly adopted resolution 57/254 to put in place a UN Decade of Education for Sustainable Development, lasting from 2005 to 2014. UNESCO was tasked with leading the Decade and developing a draft International Implementation Scheme (IIS) for *the Decade*.

The sustainable development movement began with, and grew out of, concerns expressed in the 1970s and 1980s that production and consumption patterns, as evidenced in the industrialised Societies, could not be sustained in terms of the planet's resources. Nor could a model of development be urged on nations which implied the kind of consumption which industrialised countries manifested. Although increased awareness has had an impact on production systems, changing lifestyles, particularly in the industrialised countries, have led to further unsustainable patterns. While pollution from production has generally fallen across the ndustrialised world, the environmental burden from consumption has grown remorselessly. Increasingly it has become clear that many social, economic and environmental issues are connected, such as: poverty, unequal distribution of resources, population growth, migration, malnutrition, health and HIV/AIDS, climate change, energy supply, ecosystems, biological diversity, water, food security, and environmental toxins.

The concept gained worldwide momentum with the publication of *Our Common Future* by the World Commission on Environment and Development in 1987. The Commission defined sustainable development in the publication as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This definition considers that while development may be essential to satisfy human needs and improve quality of life, it should occur in such a way that the capacity of the natural environment to meet present and future needs is not compromised.

The publication *Caring for the Earth: A Strategy for Sustainable Living* by the World Conservation Union (IUCN), the United Nations Environment Programme and the World Wide Fund For Nature (WWF) in 1991, contains a definition of sustainable development that complements the one from *Our Common Future*. It defined sustainable development as "improving the quality of human life while living within the carrying capacity of supporting ecosystems."



The Brundtland Commission definition emphasizes meeting human needs in a manner that respects intergenerational responsibility and the IUCN definition emphasizes improving the quality of human life while protecting the Earth's capacity for regeneration. The two definitions together give a good understanding of ESD.

For ESD, emphasis on cultural aspects will underline the importance of:

- Recognising diversity: the rich tapestry of human experience in the many physical and sociocultural contexts of the world;
- Growing in respect and tolerance of difference: where contact with otherness is enriching, challenging and stimulating;
- Acknowledging values in open debate and with a commitment to keep the dialogue going;
- Modelling values of respect and dignity which underpin sustainable development, in personal and institutional life;
- Building human capacity in all aspects of sustainable development;
- Using local indigenous knowledge of flora and fauna and sustainable agricultural practices, water use, etc;
- Fostering support of practices and traditions which build sustainability including aspects such as preventing excessive rural exodus;
- Recognising and working with culturally specific views of nature, society and the world, rather than ignoring them or destroying them, consciously or inadvertently, in the name of development;
- Employing local patterns of communication, including the use and development of local languages, as vectors of interaction and cultural identity.

Cultures must be respected as the living and dynamic contexts within which human beings everywhere find their values and identity. In fact the three areas whihc comprise sustainable development – society, environment and economy – are interconnected, through the dimension of culture, a characteristic of sustainable development which we must always bear in mind.

But itrespective of the actual culture, the underlying values which education for sustainable development must promote include at least the following:

- Respect for the dignity and human rights of all people throughout the world and a commitment to social and economic justice for all;
- Respect for the human rights of future generations and a commitment to intergenerational responsibility;
- Respect and care for the greater community of life in all its diversity which involves the protection and restoration of the Earth's ecosystems;
- Respect for cultural diversity and a commitment to build locally and globally a culture of tolerance, non-violence and peace.



Education for sustainable development will aim to demonstrate the following features:

- Interdisciplinary and holistic: learning for sustainable development embedded in the whole curriculum, not as a separate subject;
- Values-driven: it is critical that the assumed norms the shared values and principles underpinning sustainable development – are made explicit so that that can be examined, debated, tested and applied;
- Critical thinking and problem solving: leading to confidence in addressing the dilemmas and challenges of sustainable development;
- Multi-method: word, art, drama, debate, experience, ... different pedagogies which model the processes. Teaching that is geared simply to passing on knowledge should be recast into an approach in which teachers and learners work together to acquire knowledge and play a role in shaping the environment of their educational institutions;
- Participatory decision-making: learners participate in decisions on how they are to learn;
- Applicability: the learning experiences offered are integrated in day to day personal and professional life.
- Locally relevant: addressing local as well as global issues, and using the language(s) which learners most commonly use. Concepts of sustainable development must be carefully expressed in other languages – languages and cultures say things differently, and each language has creative ways of expressing new concepts.

The role of science and technology (education) deserves highlighting as science provides people with ways to understand the world and their role in it. ESD needs to provide a scientific understanding of sustainability together with an understanding of the values, principles, and lifestyles that will lead to the transition to sustainable development. Science (education) should be regarded broadly to include the social sciences as well as natural sciences and traditional approaches to learning and understanding as well as formal science. Technology (education) provides people with the tools to change their situation as results of learning and expression. Technology (education) should also be regarded broadly to include traditional use of materials and application of knowledge as well as manufactured items. Technology must be applied consistently with the goals of sustainability; misapplication of science and technology can undermine efforts to simultaneously protect the environment and provide for people's economic and personal needs. Education that provides access to science and technology is an area where common cause should be made by advocating strongly for local input into how science and technology should be used.



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Within ESD, three perspective, and their sub-divisions, to consider are:

Socio-cultural perspectives

Human rights: Peace and human security: Gender equality: Cultural diversity and intercultural understanding: Health: HIV/AIDS: Governance.

Environmental perspectives

Natural resources (water, energy, agriculture, biodiversity): Climate change: Rural development: Sustainable urbanisation: Disaster prevention and mitigation:

Economic perspectives

Poverty reduction: Corporate responsibility and accountability: Market economy: Stakeholders are asked to apply the following *seven* strategies, both in their own institutional frameworks and in the networks and alliances in which they function.

The *seven* strategies are:

- Advocacy and vision building
- Consultation and ownership
- Partnership and networks
- Capacity building and training
- Research and innovation
- Use of Information and Communication Technologies (ICTs)
- Monitoring and evaluation

International cooperation:

Actors at international level Roles and functions such as ICASE are asked to:

- promote ESD and integrate ESD planning into relevant work plans and initiatives
- facilitate and participate in international and regional fora
- promote inter-regional exchange and learning
- inform members of ESD developments
- advocate and lobby with international bodies



Risk Assessment

Jack Holbrook, past President, ICASE

Everything we do is risky. Things can go right or things can go wrong. There is a risk in crossing the road. There is a risk of getting an infection when in close proximity to another person. There is a risk of tripping or falling over on entering a building, or a room, or a laboratory. There is a risk in carry out an experiment in the laboratory.

So how do we decide whether the risk is sufficiently low that we are happy to carry out the things that we do?

A risk is a combination of the HAZARD and also the PROBABILITY that the hazard will happen. Low risk activities are those which are justified because the hazard is small, or the probability that it will happen is very small. This risk can be considered with respect to both factors. For example, a major hazard would be if an aircraft crashed, yet we still fly because the probability of it happening is very small (in fact statistics suggest it is the safest form of transport as the number of fatalities per 1,000,000 people is less that from accidents on the railways or the roads.

The above applies whether the situation being considered is within the school or in society, whether it is in the home or the shopping centre. This means that we are constantly determining whether the hazard or the probability of it happening is unacceptable.

In many developing countries, laboratory equipment is very limited, as is safety equipment. The wearing of laboratory coats or eye goggles is just not possible. Does this mean that experiments should not be done (the hazard is too great), or it is important that the probability needs to be reduced to a level acceptable to that society?

No activity can ever be completely free of risk. Taking precautions to make the risks "as low as reasonably practical" is just common sense. For the laboratory, this is the meaning of laboratory safety.

As you walk along the pedestrian roadway, do you paid attention to where you are going, look out for other people coming the other way, or look for obstacles in your path? Looking where you go makes the risk of an accident lower than if you dont pay attention. Yet notice how a blind person can also make the risk low. And, of course, the more familiar we are with walking along the same pedestrian way, or using the same laboratory equipment, the more we are able to predcit likely hazards and make the probability of such a mishap low.



So should we really remove hazardous operations whether in the home, or the school laboratory? I hope your response is – YES, unless the probability of an accident from the operaction is made acceptably low. And here is the major point about safety in the science laboratory. It is making the risk low.

Let us consider the use of fireworks – should they be banned? Reflect on the table below: do you support the left hand column or the right?

Fireworks should be banned! – the risk of an accident is too high	The use of fireworks is safe – although the hazard is high, the probability of an accident can be made low
Each year many people around the world are injured from using or manufacturing fireworks.	Many millions of people take part in private firework displays or visit public displays without any injury occurringl.
The hazards are too great. People can be killed	The hazards are great but fireworks are generally safe if handled correctly so that the proabability of an accident is lowered.
Firwords can scare animals	Many pets do not like the loud noises and should be kept indoors.
	Fantastic firework displays are a great source of enjoyment for many people.

End piece

We are aware, as science teachers, that school laboratories can be hazardous places. It is thus important that we take steps to reduce the probability of an accident For this the teacher, or even more important the students, should be carried out a risk assessment before every experiment.

A risk assessment is caried out by identifying the potential hazards and then indicating how they can be reduced to acceptable levels. Information on chemical and equipment hazards can be found in books or from safety cards. However, hazards associated with overcrowded laboratories, lack of a good air flow, or using home made apparatus should also be considered.

So the real issue is – can you determine the hazards students' face when they are in your lessons? Can you take steps to reduce the probability that these hazards cause accidents? And are you satisfied that after the steps have been taken, the risk is acceptable?



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Promoting Excellence in Science Teaching and Learning

Science Education Research

ASE Annual Conference 2013 @ University of Reading

Wednesday 2nd - Saturday 5th January 2013

Research Seminar Series Promoted by the ASE Research Committee

We welcome papers on science education research topics.

The contributions can include:

- teacher education
- early years education,
- primary education
- secondary education
- curriculum development and evaluation
- pedagogy
- learning and assessment in science

We hope to have contributions from teacher educators, teachers, higher education degree students and from colleagues involved with curriculum development and evaluation.

Submissions

Please submit an abstract of no more than 500 words (in PDF format) to the ASE at <u>f.j.woodhouse@hud.ac.uk</u> setting out your research questions and rationale, background to the study, methods, findings and references (references are not included in the word limit).

All submissions will be peer reviewed and accompanying papers published in an on-line **Conference proceedings** and we welcome work in progress and contributions from across the world.

Format for submissions :

The presentations should be 20 minutes with an additional 10 minutes for questions.

Initial submissions **31st July**. A final conference paper (circa 2,500 for research in progress or circa 5,000 for completed research and available for publication) to be submitted by **31st October 2012**.

For registration details please see the ASE website www.ase.co.uk

http://www.icaseonline.net



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Following similar conferences in 2003, 2007 and 2010, the International Council of Associations of Science Education holds the next World Conference on Science and Technology Education

Sunday 29 September - Thursday 3 October, 2013. in the Borneo Convention Centre, Kuching, Sarawak. See: http://www.icase2013.org/

The theme of the conference, *'Live Science, Love Learning, Create Change'*, addresses contemporary issues of importance to Science Teacher Associations, Science Centres, science teacher educators as well as both students and teachers as we move into the second decade after the millennium.

"Live Science" – encourages ICASE member Science Teacher Associations and Science and Technology Education Centres to recognize that science is more than just a subject at school, to impact knowledge and skills adopted from yesterday's approaches. The promotion of science education as interdisciplinary learning is a vital step toward promoting students' acquisition of 21st Century skills not only for sustainable and responsibly citizenship but for a career in an increasing science and technology driven world society.

"Love Learning" – focusses on the role of the teacher, and hence considerations for Science Teacher Associations and Science and Technology Education Centres, not only to guide students to want to participate and acquire the knowledge and skills for tomorrow's society, but that students' own self-motivation is a necessary and key factor in embracing science education as a crucial component of learning.

"Create Change" - deals with the role of Science Teacher Associations, Science and Technology Education Centres as well as teachers themselves in using science education at every level as a way of shifting the mindset on meaningful sustainability, from merely 'talking about' best pedagogical practices to 'undertaking' them, creating a generational change in student attitudes and values towards science and school and the role of learning through science lessons in shaping their future lives.



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ICASE World Conference 2013

Call for papers



WorldSTE2013 Call for Papers

Want to be part of what is shaping up to be the premiere science and technology education event of 2013?

Well now is your opportunity... The World Conference on Science and Technology Education (WorldSTE2013) is proud to announce the Call for Papers. With diverse topics and a unique destination that will inspire, WorldSTE2013 promises to bring the world of science and technology education to teachers, educators, policy officers and scientists worldwide.

The paper submission process can be viewed by clicking on this link

http://worldste2013.org/conference/call-for-papers.html

The deadline for paper submissions is 31 December 2012.

We look forward to seeing you in Kuching, Malaysia, 29 September - 3 October, 2013, for the most anticipated WorldSTE Conference ever on the theme:

"Live Science, Love Learning, Create Change"



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ICASE Executive Committee 2011-2013

The ICASE Executive Committee is persons who make decisions on behalf of the ICASE Governing Body. The ICASE Governing Body is the **ICASE member organisations**.



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For more information about ICASE Executive Committee, please visit the ICASE Website <u>www.icaseonline.net</u>