



International Council of Associations for Science Education

Supporting and promoting science education internationally
The ICASE Newsletter

MARCH 2012

Welcome to the ICASE March 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.



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<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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For information please visit our web page:
<http://www.icaseonline.net/news.html>

Read or Submit a Manuscript to the ICASE Journal:
Science Education International



For information please visit our Journal web page:
<http://www.icaseonline.net/seiweb>

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ICASE News



Jack Holbrook, ICASE Past President

ICASE News

PROFILES Project Meeting in Israel



Members of the PROFILES consortium enjoying a little sun at Masada, near the Dead Sea, Israel. In the photograph the ICASE representatives present are - fourth, fifth and sixth from the right (front row) – Jack Holbrook, Miia Rannikmae and Bulent Cavas.

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The 3rd PROFILES consortium meeting was scheduled 12-16th February 2012. This European project seeks to make the teaching of science subjects more popular and relevant for students by guiding teachers to promote motivational, inquiry-based science education at the basic and secondary school level.

While the major ICASE role in this project is dissemination and ICASE is strongly promoting the ICASE World Conference in Sawarak, Malaysia (29 Sept to 3rd Oct, (2013), the ICASE Executive Committee is being asked to give official ICASE endorsement to the philosophical approach in line with enhancing STL (scientific and technological literacy).

New ICASE Executive Committee members

On behalf of the ICASE President, may I introduce THREE new replacement members to the ICASE Executive Committee.

- A. Lindsey Connor who takes over as the ICASE Treasurer. Lindsey is from Canterbury, New Zealand
- B. Christine McDonald who takes over as the Australia-Pacific Representative. Christine is from Mt Gravatt, Australia.
- C. Steven Sexton who takes over as the Chair, of the Primary (pre-secondary) and Informal Standing Committee. Steven is based in Otago, New Zealand.

News from Member Organisations

Is your organisation wishing to disseminate ideas and materials, or establish links worldwide? Why not include news from your organisation in this newsletter? Please send to the editor at jack@ut.ee

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European Science and Technology in Action:
Building Links with Industry, Schools and Home

**An European project on promoting IBSE
learning**

The objective of ESTABLISH is the dissemination and use of an inquiry-based teaching method for science with second level students (age 12-18 years) on a large scale in Europe by creating authentic learning environments, involving all stakeholders to drive change in the classroom.

Over the course of the project, a number of ESTABLISH Teaching and Learning Inquiry Based Science Education (IBSE) units will be developed and adapted for use in classrooms across Europe. Further information on these units together with other deliverables from the project can be found [here](#).

The **ESTABLISH** group of over 60 partners from 11 European countries will work together on this four year project to encourage and promote the more widespread use of **Inquiry-Based Science Education (IBSE)** in second level schools.

If you would like to contact us with general comments or inquiries please contact us [here](#).

ESTABLISH: Bringing together the stakeholders to influence classroom practice

Innovation in classroom practice will be achieved through the involvement of stakeholders for the development and provision of:

- Appropriate teaching and learning IBSE units (informed by scientific and industrial communities)
- Appropriate supports for both in-service and pre-service teachers to implement IBSE

The outcomes of ESTABLISH will be:

- a large team of science teachers across Europe who are skilled and confident in inquiry based science teaching methodology;
- identification of suitable model(s) of science teacher education, at both pre- and in-service levels, for inquiry based science teaching;
- promotion of inquiry in the classroom, involving the relevant stakeholders in science and science education.

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Establish Teacher Conference 2012

An ESTABLISH conference will take place on the 7th-9th June 2012 in Dublin City University, Ireland (www.dcu.ie) in conjunction with the 5th Science and Mathematics Education Conference, SMEC 2012 (www.dcu.ie/smec). Hosted by the Centre for the Advancement of Science and Mathematics Teaching and Learning (CASTeL), this year's conference will focus on *Teaching at the heart of learning*. To explore this multifaceted concept we would like to invite abstracts which will approach the topics of classroom practice; evaluation & assessment; teacher education; & reflective teachers. As in previous years there will be opportunities for participants to contribute oral, poster and workshop presentations.

The ESTABLISH teacher conference will host delegations of second level science teachers from across the 11 countries involved (Ireland, the Netherlands, Cyprus, Sweden, Poland, Czech Republic, Malta, Slovakia, Estonia, Italy & Germany) and will be an invaluable networking opportunity for teachers of science and mathematics.

This conference will offer workshops from the ESTABLISH group and other projects, round table discussions and a poster presentation session. Teachers will have an opportunity to visit local industries to see how such visits could provide authentic learning experiences for their students.

We are delighted to announce that our invited plenary speakers will include Prof. William McComas, University of Arkansas, USA; Prof. Paul Black, King's College, London, UK; Prof. Janet Ainley, University of Leicester, UK and Prof. Ton Ellermeijer, Centre for Microcomputer Applications, the Netherlands.

Registration and full details will be available shortly at: www.dcu.ie/smec/2012.

In the interim, feedback and applications can be submitted to castel@dcu.ie

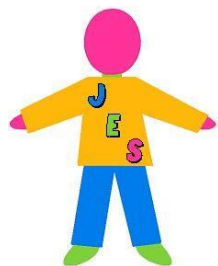
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Journal of Emergent Science

The Journal of Emergent Science (JES) has been published on the ASE website. JES is a professional research e-journal published by the Emergent Science Network in collaboration with ASE. The journal focuses on science (including health, technology and engineering) for young children from birth to 8 years of age. The key features of the journal are that it:

- ◆ is child-centred
- ◆ focuses on scientific development of children from birth to 8 years of age, considering the transitions from one stage to the next
- ◆ contains easily accessible yet rigorous support for the development of professional skills;
- ◆ focuses on effective early years science practice and leadership
- ◆ considers the implications of research into emergent science practice and provision
- ◆ contains exemplars of good learning and development firmly based in good practice
- ◆ supports analysis and evaluation of professional practice

Articles in the journal highlight the importance of first learning and experiences in science and attempts to redress the emphasis on secondary science education, especially since science learning starts at birth. The co-editors, Jane Johnston (Bishop Grosseteste University College Lincoln) and Sue Dale Tunnicliffe (Institute of Education, London and formerly the first pre secondary science officer ICASE)) are researchers and lecturers fascinated by these critical years where interest and understanding of science is formed, and passionate about focusing on support for professionals who are attempting to use the impact of research to develop their own practice.

The journal will be published twice a year; March and September. During 2011 it was free and as from 2012 it will only be available for a subscription fee of \$50 although all ASE members will continue to receive the journal free of charge as a membership benefit. The first two editions can be found on the ASE website at www.ase.org.uk.

Subscription Application & Remittance

Name _____
Address _____

I wish to subscribe to the Journal for Emergent Science

☐ 1 year Subscription \$50

Please debit my Mastercard/Visa card number with the amount of \$50

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SAFE SCI: Be Protected!

By Dr. Ken Roy

Director of Environmental Health & Safety Glastonbury Public Schools

Glastonbury, CT & Authorized OSHA Instructor. Royk@glastonburyus.org

A SAFER GREENHOUSE?

Greenhouses have been around for several thousand years, allowing for the survival of domesticated plants during inclement weather by growing them 'indoors.' History-wise, the first recorded primitive greenhouses are noted with the early Roman Emperor Tiberius who had a fascination for Armenian cucumbers. He charged his gardener to find a means of providing the Roman Emperor with his favorite Armenian cucumbers daily year round. The gardener developed artificial methods to address the command of his Emperor. The Armenian cucumbers were grown in wheeled carts so they could receive the most sun throughout the day. With cold night temperatures, the carts were moved indoors and in some instances in houses glazed with oiled cloth. This allowed for sunlight and trapped the sun's rays for warmth. Thus the first greenhouses were "born!" The early greenhouses were referred to as botanical gardens. The rest is history, as they say, with the advent of technology and applications to glass and plastic structured greenhouses. The early Roman concept of creating a special environment conducive to plant growth year round has been captured by today's greenhouse structures.

With the advances in greenhouse design, thanks to the evolution, and revolution at times, in technology and science, primary and secondary schools have been able to make use of these affordable structures for formal academic research and study. Many schools foster the study of plants in biology and environmental science classes by using greenhouses. As with all science activities, use of the greenhouse needs to be done with safety in mind.

What are some of the issues which should be addressed for safety consideration? Here is a beginning list of items that science teachers should embrace for a safer greenhouse operation:

1. Engineering Controls – Make sure ventilation, heating systems, fans and other engineering controls are operating at peak efficiency. This includes the adoption of a preventative maintenance (PM) schedule. Teacher should work with their school's maintenance department to schedule PM activities.
2. Alarm/Sensor Systems – Greenhouses should be monitored for environmental elements such as humidity, temperature, etc. Sensor systems are available and will help to maintain a safer and healthier working environment for all - teachers, students and plants.
3. Standard Operating Procedures – Have a list of standard operating procedures or SOPs for both students and teachers/custodians relative to working in and cleaning the greenhouse.
4. Personal Protective Equipment – Always have appropriate personal protective equipment or PPE such as safety glasses, chemical splash goggles, gloves, aprons and footwear available with means of sanitizing. Use of fertilizers, pesticides, and other products used in a greenhouse often require use of such PPE.
5. Housekeeping – Included in SOPs should be housekeeping rules. From cleaning off tools after use to keeping walkways clear from trip/fall or slip/fall hazards must be addressed.



6. Safety Acknowledgement Form – Students and parents should sign off on a safety acknowledgement form noting the greenhouse can be an unsafe place and has SOPs and behaviors which must be followed for a safer operation and learning/working environment.
7. Inspections – Greenhouses should be inspected on a regular basis – each day of the week to insure appropriate plant specimens are being grown, housekeeping is being effected, security is in place and engineering controls are fully operational.
8. Electrical Security – All electrical receptacles in the greenhouse should be GFI or GFCI protected to prevent electric shock or electrocution.
9. Produce – Before using any fruits or vegetables for academic investigations, greenhouse products should be thoroughly washed. Additionally, eating of any greenhouse products should be prohibited, given health controls cannot be guaranteed.
10. Food/Drink – Like all science laboratories, use of food and drink should be prohibited in the greenhouse to prevent the potential for cross contamination.
11. Fertilizer/Pesticide Use – Make sure school policies are reviewed relative to applications of fertilizers and pesticides before considering use on greenhouse plants. Pesticides can be especially toxic and hazardous. Natural alternatives should be explored and used whenever possible. Also provide appropriate application techniques and secured storage for these chemicals.
12. Trash – Many schools sort their trash. In this way plant material and other compostables should be placed in special containers for appropriate trash removal and potential composting activities.
13. Insect Magnets – Never leave food, wrappers, etc. around the greenhouse in that they will attract insect pests.
14. Sharps – Never leave sharps around like razor blades, knives, pruners – place them in appropriate and secured storage areas which should be dry to prevent rusting.
15. Labeling – Always label all equipment with the teacher's name, especially if the greenhouse is shared by several classes of students.
16. Slippery Surfaces – Avoid wearing flip flops, sandals and leather soles to prevent slip/fall hazards.
17. Hand Washing – Always wash hands after working in the greenhouse with soap and water.

BOTTOM-LINE!

The bottom-line is – greenhouses can be great educational vehicles for hands-on science activities in biology and environmental sciences. Always plan ahead safety-wise to secure and maintain a safer working environment for students and teachers.

References:

Botany Suite 101, "History of the Greenhouse;"

<http://sharonfalsetto.suite101.com/history-of-the-greenhousea81808>

The Ohio State University, "The Biological Sciences Greenhouse Facility;"

<http://www.biosci.ohiostate.edu/~plantbio/greenhouse/ghguidelines.html>

The Ohio State University, "The Biological Sciences Greenhouse Facility;"

<http://www.biosci.ohiostate.edu/~plantbio/greenhouse/ghguidelines.html>



Calendar of Conferences

NSTA Annual Conference 2012

Please mark your calendar for some special international activities planned during the NSTA National Conference on Science Education in Indianapolis, Indiana, March 29-April 1, 2012.

Activities begin on Wednesday, March 28, with science classroom visits (tentative) in the Indianapolis area—this will be a ticketed event with a minimal cost to cover transportation. That evening, please join us at the President's International Reception for all international visitors and invited guests.

On Thursday, March 29, and Friday, March 30, there will be a conference dedicated to science education from an international perspective. The focus will be on Global Conversations in Science Education with the theme of "STEMing Across Borders: An International Perspective on Science, Technology, Engineering and Mathematics." There will be numerous opportunities for international visitors to network together and to interact with science educators from various cultures, including those from North America. This is a ticketed event (M-2), open to all registered attendees of the NSTA National Conference on Science Education (at no additional costs). Online registration is now open.

For more information, visit the NSTA website at <http://www.nsta.org/conferences/2012ind/registration.aspx>

The conference commences with a plenary talk by Dr. Julio E. Lopez-Ferrao, Program Director, Division of Research on Learning in Formal and Informal Settings at the National Science Foundation in Washington, D.C. Dr. Lopez-Ferrao will speak about Conceptualization of STEM as a construct, directions in STEM fields, and future implications for STEM teaching and learning.

This plenary session will be followed by concurrent sessions related to the conference theme, and a full complement of papers will be presented in a poster session, followed by a luncheon plenary speaker, Dr. Marissa Rollnick, Chair of Science Education, Marang Centre for Mathematics and Science Education, Wits School of Education, Wits University, South Africa. Her talk is titled "Towards STEM improvement in South Africa- Breaking the Vicious Cycle".

There will also be a panel discussion. The day will conclude with short presentations from participants on current trends, issues, and best practices from around the world. On Friday, March 30, there will be a "Welcome to My Classroom" showcase, highlighting classroom settings from around the world.

For more information, please visit the website at <http://www.nsta.org/portals/international.aspx>.



21st Symposium on Chemistry and Science Education to be held at the TU Dortmund University, 17-19 May 2012

Issues of Heterogeneity and Cultural Diversity in Science Education and Science Education Research

The 21st Symposium on Chemistry and Science Education will continue the long tradition begun in 1981 with the first symposium on chemical education organized by Hans-Jürgen Schmidt. The 2012 symposium is titled “**Issues of Heterogeneity and Cultural Diversity in Science Education and Science Education Research**”. Heterogeneity and cultural diversity are becoming increasingly important challenges for educational systems worldwide. Growing rates of migration and higher numbers of multi-cultural societies mean that educators must achieve a broader spectrum of competencies among their young people. Science and chemistry teaching are not untouched by these developments, challenging the practices and methodologies in these areas. Answers are demanded from science education research in the areas of understanding potential problems and providing impulses towards more effective practices.

The symposium's main questions will address:

- Which science teaching problems are connected to different areas of heterogeneity in science classrooms? How can they be overcome?
- Which influences do learners' multi-cultural backgrounds have concerning the learning of science?
- What types of problems arise due to different linguistic abilities or a background including a different native language? How can we best deal with linguistic heterogeneity in science classrooms?
- How can we teach the domain-specific language of science in classes containing students with different native languages?
- How do we cope with students with special needs in science, e.g. in lab environments?
- What are the challenges in and potential innovations involved with teaching gifted children in science classes?

Which changes can examples of good teaching practices in different countries suggest for bettering science teaching with respect to issues of heterogeneity and cultural diversity?

All contributions will be presented by invited lecturers. There will be key-note lectures and short presentations. Please contact Dr. Silvija Markic, University of Bremen for details: smarkic@uni-bremen.de.

Conference chairs: Prof. Dr. Bernd Ralle, TU Dortmund University, bernd.alle@tu-dortmund.de; Prof. Dr. Ingo Eilks, University of Bremen, ingo.eilks@uni-bremen.de; Dr. Silvija Markic, University of Bremen, smarkic@uni-bremen.de; Prof. Dr. David Di Fuccia, University of Kassel, difuccia@uni-kassel.de

Further information: <http://www.chemiedidaktik.uni-bremen.de/symp2012/index.html>.

Conference fees: None. Travel costs, accommodation and social events are the responsibility of the participants.



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Welcome to the World Conference on Physics Education

We are looking forward to seeing physics educators, teachers, researchers, and policy makers from around the world at this very first World Conference on Physics Education

Date: July 1-6, 2012

Venue: Bahçeşehir Üniversitesi, İstanbul / Turkey
Çırağan Caddesi, Osmanpaşa Mektebi Sokak, No: 4 - 6
34353 Beşiktaş, ISTANBUL, TURKEY

The conference was initiated by **Groupe International de Recherche sur l'Enseignement de la Physique (GIREP)** and the **International Commission on Physics Education (ICPE)** – Commission 14 of the **International Union for Pure and Applied Physics (IUPAP)**. It is being sponsored by **GIREP**, **ICPE** and the **Multimedia in Physics Teaching and Learning (MPTL)** group and endorsed by **American Association of Physics Teachers (AAPT)**, **Latin American Physics Education Network (LAPEN)** and the **Asian Physics Education Network (AsPEN)**.

The vision for **2012 World Conference on Physics Education** is to follow a global participative process before, during and after the conference. The Conference will be structured to help foster collaborations on physics education research and development which can transcend national boundaries. The goal will be reached through working sessions which will develop actions plans that strengthen the teaching and learning of physics at all levels and in many countries.

The 2012 World Conference on Physics Education will be a concrete step forward in global cooperation. Envisaged as a series of conferences with a four year periodicity, it would be a working conference with follow-up actions that presumably would carry over to the following conference.

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XV IOSTE INTERNATIONAL SYMPOSIUM



Yasmine Hammamet – Tunisia – 29 October – 3 November, 2012

We are pleased to invite you to participate in the XV IOSTE International Symposium on **Science & Technology Education for Development, Citizenship and Social Justice** to be held at Yasmine Hammamet (29 October – 3 November, 2012).

The conference is organized by EDIPS / ISEFC in cooperation with **UVT, DISEMEF, FSB, CENAFFE, ATDSVT, ATDM**, and other institutions and associations (*see below the meaning of these acronyms*).

IOSTE XV is an International Symposium for researchers to present research papers, workshops, posters and explore collaboration with other researchers in the fields of Education and Research. Our aim is to inspire and provoke meaningful discussions and debates.

IOSTE XV will include a diverse and comprehensive program covering a number of areas of science and technology education (teaching, learning, practice, development, innovations, evaluation,...). The program will also include a wide range of activities designed to facilitate the exchange of expertise, experience, and resources amongst researchers, educators and trainers.

The IOSTE XV will be held in **Yasmine Hammamet**, a city in the North-East part of Tunisia. The event will bring together scientists, technologists, teachers, trainers, education inspectors, policy makers and graduate students from across the globe to promote discussion of issues relating to the theme and sub-themes.

Early Registration Fees

Before July 31, 2012

Late Registration Fees

After July 31, 2012

Symposium dates

October 29 - November 3, 2012

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SUBMISSION:

You can propose:

A single oral communication (a slot of 30 minutes, including 10 minutes of discussion)

Coordinated interventions during a slot of 90 minutes: mini-symposium or round-table, with authors coming from at least two countries

A poster, which will be visible during all the symposium; it will be orally presented and discussed during the posters' sessions

- Each participant can be first author for only one proposal (one oral communication, or round table / mini-symposium, or poster). He / she can be co-author of several other proposals.
- Each first author must present the communication (or the poster).
- **For each proposal, you have to choose one of the nine strands, and to submit an abstract and a 3 pages synopsis only, or an abstract plus the full paper.**
- Each proposal will be pair-reviewed. The proposal's originality, its relationship to the conference theme and the clarity of its objectives, organization and approach are factors considered in selection.

The form for abstract can be uploaded from <http://www.inedp.org/ioste-XV> and will be sent by email (iosteXV@gmail.com) or through the online submission system by March 1, 2012. **Please note that submissions must be made through the online submission system and by email at the same time.** (To facilitate file management, please use the following system to name your file: YourSurname_Country.doc or YourSurname_Country.docx or YourSurname_Country.rtf)

Accepted proposals will be included in the Symposium Proceedings, only after reception of the registration fees of the first author.

The deadline for the full paper submissions is July 1, 2012. It will be peer reviewed. The guideline for the presentation of the full papers is joined below.

For further details on the symposium, please visit our website: <http://www.inedp.org/ioste-XV>

I, on behalf of **IOSTE / EDIPS / DISEMEF / ISEFC / UVT** and cooperating partners, feel honored to be hosting the conference in Tunisia. We look forward to seeing you at the conference.

IOSTE (International Organization for Science and Technology Education); **EDIPS** (Research Laboratory of education, didactics and psychology: Laboratoire de recherche en éducation, didactique et psychologie); **ISEFC** (Higher Institute of Education and Continuous Training: Institut Supérieur de l'Éducation et de la Formation Continue); **UVT** (University Virtual of Tunis: Université Virtuelle de Tunis); **DISEMEF** (Ecole doctorale "Didactiques, Sciences de l'enseignement, Métiers de l'Éducation et de la Formation"); **FSB** (Faculty of Sciences, Bizerte); **CENAFFE** (Centre National de Formation des Formateurs en Éducation de Tunisie); **ATDSVT** (Association Tunisienne de Didactique des Sciences de la Vie et de la Terre); **ATDM** (Association Tunisienne de Didactique des Mathématiques).

Kind regards,

Mondher **ABROUGUI**,

Contact: abrouguimondher@yahoo.fr

EDIPS - ISEFC - University Virtual of Tunis Chair, Local XV IOSTE Symposium Organizing Committee

Website URL: <http://www.inedp.org> Direct URL: <http://www.inedp.org/?conference=ioste-XV>

Organizing Committee Email: iosteXV@gmail.com



The THEME: “Science & Technology Education for development, citizenship and social justice” is expressed through **9 Strands (S1 to S9):**

S1: Education for Sustainable Development, Human Rights and Health.

Suggested topics

- Education for all. - Citizenship education. - ESD (Education for Sustainable Development) / Environmental education.
- Health education/ health promotion/Sex education. - Ethics in STE

S2: Cultural, social and gender issues in STE

Suggested topics

- Gender issues. - Values and Ethics in STE. - International comparisons. - Student diversity and inclusive education.
- Political issues in STE. - Indigenous Knowledge and Intercultural Education. - Language problems / linguistic diversity
- Conceptions, science, justice and citizenship - Science, Technology and Society.

S3: STE and religion.

Suggested topics

- Nature of science, nature of religion. - Science education versus religious education
- Science and religion: strategies for learning and teaching, teachers training, curriculum design.
- Science and Belief: alternative conceptions. - Teaching religions or enrolling in a religion? Inside or outside school?

S4: ICT for equity and democracy in STE.

Suggested topics

- Digital divide. - ICT and e-learning in teacher development. - Smart school and ICT-based education.
- Distance learning and blended learning. - ICT learning and instructional design.
- Perspectives and educational programs beyond ICT

S5: Epistemology, History and Philosophy in STE.

Suggested topics

- History and epistemology in mathematics, fundamental and applied sciences
- History and Philosophy of Biomedical and Health Education. - Philosophy of Science: Modeling, complexity, prediction

S6: Socio-scientific issues in STE.

Suggested topics

- Socio-scientific issues and cognitive process in formal and nonformal learning - Using Socio-scientific issues for STE
- Education in science centres and museums - Positioning arguments and controversies in STE

S7: Teacher training and teaching practices

Suggested topics

- Teachers and trainers in science and technology: Policy, missions, training, roles, values and perspectives. - Teaching STE versus conception and competence - STE: Practices and didactic design

S8: Curricula, textbooks and media in STE

Suggested topics

- Critical analysis of official programs and textbooks. - Curriculum design and development in STE.
- Inter/intra / trans-disciplinary topics. - Science, Media and Society

S9: Evaluation in STE.

Suggested topics

- Assessment and ranking of schools and universities. - Assessment dealing with learning, training and citizenship education
- Competency assessment. - Social impact of assessment. - Theory and practice of Assessment, Evaluation, Testing and Measurement. - Evaluation of Educational Research. - Educational Assessment Policies and System Monitoring.
- International comparative evaluations (PISA, TIMMS, ROSE,...)



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ICASE World Conference 2013



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.icas2013.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 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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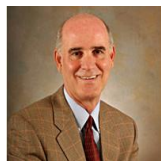
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