International Council of Associations for Science Education

Supporting and promoting science education internationally
The ICASE Newsletter

JANUARY 2012

Welcome to the ICASE January 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 chldren 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

Join the ICASE Community to receive the Newsletter

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

Contents of Newsletter

Editorial;
Jack Holbrook
ICASE Past President
jack@ut.ee

Bulent Cavas
Publications Committee Chair
bulentcavas@gmail.com

ICASE News

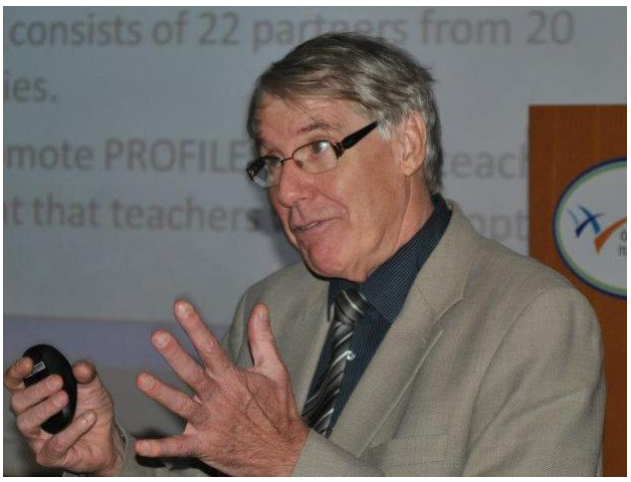
Jack Holbrook, ICASE Past President

ICASE/DEU meeting on PROFILES in Izmir / TURKEY

On the 14th December a group of Turkish science and technology teachers from Izmir gather for a meeting as part of a professional continuous development programme undertaken by ICASE and Dokuz Eylul University related to the PROFILES (professional reflection oriented focus on inquiry learning and education through science) project. The meeting was coordinated by Bulent Cavas (centre front), Chair of the ICASE Publications Committee and PROFILES Coordinator for DEU, ably supported by Yasemin Ozdem (far right), master students Merve Kocagül and Bekir Güler.

The event was organized in the Izmir Marti Private Schools. Izmir Marti Private Schools, open its doors in 2010, in Izmir's peaceful and beautiful district of Guzelbahce. The most important features of the school are education in the English and Italian languages aiming to educate students in their use throughout their lives. Besides a strong academic education, Izmir Marti Private Schools gives importance to music, sports and also social and scientific disciplines to develop confident, successful and happy students.

The programme included an overview of determining the self efficacy of teachers to implement PROFILES modules in the manner intended by Jack Holbrook – see Picture on the right, a presentation on the teaching of a module using robotics for learning about reflection of light on different coloured surfaces (and using this to control the speed of a robotic car) by Burcu Kolbasi, and a presentation on motivational scenarios to explore a number of topics at senior secondary school level as examples of modules being developed in another country (Estonia) by Miia Rannikmae – see picture on left.



ICASE would like to thank Izmir Marti School for organization of this event. ICASE particularly thanks to Seyda Kaya (School Director) and Duygu Seyman (Science and Technology Teacher) for their great help and support.

ICASE Implementation Plan

Over the past year, the ICASE Executive Committee have been considering the way forward and especially the Mission and focus for ICASE as it looks beyond is 40th year (2013) and focuses on its desired attainments by its 50th anniversary in 2023. While its mission is very much tied to supporting Science Teacher Associations, in whatever form or focus this may have in various Countries and Continents, its future focus is seen as going beyond dissemination of ideas and developments by member organisations (although this is still an area of importance) and more in trying to initiate Excellence in Science Education as its major target worldwide. This of course is a major challenge not least because of the many visions of what is meant by the teaching of science subjects in primary and secondary schools (i.e. the meaning which teachers attach to science education). Major developments have taken place in the lifetime of ICASE, but giving relevant meaning to science education (or science and technology education to some) is still a major challenge.

To this end the ICASE Executive Committee has recently agreed to a Medium to Long term Implementation plans and now turns its attention to actions over the next 2 years, up to and including the next General Assembly scheduled for Sarawak, Malaysia in 2013. Future editions of this newsletter will endeavour to elaborate on these plans.

International Council of Associations for Science Education

Assessing 21st Century Skills

Dr Jack Holbrook Immediate Past President, ICASE

It has long been recognised that there is a strong correlation between quantity of recall by a student and that student's academic ability. This has been the mainstay of student examinations through the ages. But is it sufficiently meaningful in today's world?

The worldwide direction of 21st century education

The purpose of education is shifting. There is:

- a demand to promote greater personal capabilities for employment;
- an expectation to develop social attributes as well as promoting cultural aspects;
- a realisation that development aspects related to democratic values needs to start at school.

Clearly the view of education as memory training is not a meaningful aspect of 21 century learning!

21st century skills – what does this mean?

Perhaps the word 'skills' in this context is misleading - is it thinking skill (knowing), action skill (doing), the skill of being oneself (being), or the skill of interacting with others ? i.e. covering the 4 education pillars put forward by UNESCO (The treasurer's within, 1996).

Terms such as **proficiency** or even **capability** might be more appropriate.
And some educational systems, such as in Europe, have preferred to refer to **competences.**

Why do we need assessment change for 21st century skills?

- School assessment today tends to measure:
  knowledge of discrete facts, rather than **capability to apply knowledge** in complex situations.
- Education places its focus on **economic development** (supporting the elite to drive the economy) rather than putting the major focus on **democratic development** for the betterment of all and the society.
- **High stakes assessment systems** alone do not generate evidence of the skill set which business and employers believe will ensure success in the 21st century.

Suggestions for Assessing 21st Century Skills

These are put forward covering 3 broad 'skills' areas:

1. **Assessing Capability of Ways of Thinking.**
   e.g. Being Creative or Innovative (showing ingenuity); Undertaking reasoning or critical thinking, based on problem solving processes and decision making; Reflecting or meta-cognition and original yet meaningful thought.
2. **Assessing Capability of Ways of Functioning.**
   e.g. Communication capabilities; Collaborative capabilities; Safe working.
3. **Assessing Attributes for Life.**
   e.g. ICT literacy; Capability for Personal and Social responsibility; Information processing literacy; Risk assessment; Citizenship and Career capabilities; Upholding Values.

Examples of Some General Assessment Areas on Ways of Thinking

Ways of Thinking	Capability	Assessment by Public Examination
Creating ideas	Knowledge	Can be assessed by Public examination
Limits, and ways, of presenting creative ideas	Knowledge/ Skills	Can possibly be assessed by Public Examinations
Be open to worthwhile ideas from others	Attitude	Only pseudo-respect if assessed through public examinations
View failure as an opportunity to learn - *realising creativity and innovation as long-term, undergoing a process of successes and frequent mistakes.*	Attitude	Can possibly be assessed in a Pubic examination, but bias may be introduced by the failures and opportunities chosen

Further Examples on Ways of Thinking

Ways of Thinking	Capability	Assessment by Public Examination
Identifying and presenting relevant investigatory problems	Knowledge	Can possibly be assessed by Public Examination
Know how to manage projects	Knowledge/skills	Can possibly be assessed by Public Examination
Show respect for cultural differences	Attitude/value	Only pseudo respect if assessed through public examination
Responds open-mindedly to different ideas and values	Attitude	Can be assessed in a Pubic examination, but bias may be introduced by the ideas and values chosen

Examples of assessing within the Area of Ways of Functioning

Ways of Functioning	Assessment Skill	Assessment by Pubic examination
Access and evaluate information	Knowledge	Not possible by public examination
Use and manage information	Skill	Possible to assess by public examination
Apply technology effectively	Skill	Can be assessed by public examination if computer based
Apply and employ technology with honesty and integrity	Attitude/Values	Cannot be assessed by public examination

Example of assessing Attributes for Life

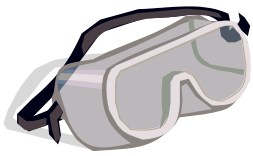
Attributes for Life	Assessment Skill	Assessment by Pubic examination
Adapt to change	Skill	Not possible by public examination
Manage goals and time	Skill	Possible to assess by public examination
Be a self directed learner	Attitude	Possibly assessed by public examination
Guide and lead others	Attitude/Values	Cannot be assessed by public examination
Exhibit Integrity	Values	Cannot be assessed by public examination

An example of assessing ?

Problem Solving and Decision Making	Assessment Skill	Assessment by Pubic examination
Understand systems and strategies for tackling unfamiliar situations	Knowledge	Can be assessed by public examination
Re-evaluate beliefs when presented with conflicting evidence	Skill	Possible to assess by public examination
Develop an investigatory question and plans for action	Skill	Possible to assess by public examination
Justifying decisions made	Attitude/Values	Possible to assess by public examination
Striving for consensus in making decisions	Skills/Values	Cannot be assessed by public examination

General Safety Practices for the Elementary Science Classroom

James A. Kaufman, Ph.D. Chair, ICASE Committee on Safety in Science Education
International Council for Associations of Science Education



1. Obtain a copy of the school district's policies and regulations regarding school safety, reporting of accidents, safety goggle legislation, disposal techniques, and use of plants and animals in the classroom. Ask your building principal or district science supervisor about applicable local, state and federal regulations.
2. If copies of the above are not available or do not exist, work with your administration and science specialists to establish written policies for your school and enforce these policies.
3. Know the location of all safety devices, including chemical splash goggles, eyewash stations (when dealing with hazardous chemicals), fire extinguishers, and be familiar with your school's plan for evacuation in case of fire or other emergencies.
4. Before beginning any science activity, discuss possible safety hazards with your students.
5. In order to promote a safer instructional environment, limit your class size to a number that you can adequately supervise. When doing inquiry-based science, safety trained volunteer assistants can be helpful in providing adequate supervision.
6. Design an instructional format that allows students maximum time to conduct a science activity, with attention and involvement of each student. One suggestion is an "Activity Team" consisting of an Organizer, an Investigator, a Recorder, and a Reporter.
7. Students should always keep their work area clean and clear of unnecessary materials such as bags, lunches, or books, and other trip/fall hazards.
8. Students should never eat or drink in the classroom where science activities are conducted.
9. Students should never be allowed to conduct any unauthorized experiment or to work alone or unsupervised.
10. Convince students that the science activity area is a special place where special precautions are always taken, even when working with ordinary and harmless materials. These precautions include wearing appropriate eye protection, washing the hands frequently, and being especially alert and responsible.
11. Regardless of the age or grade level of the student, horseplay or irresponsible behavior that threatens the safety of any individual cannot be allowed.
12. Although safety aspects should be stressed, do not create an atmosphere of fear and apprehension, which will prevent students from enjoying their science experiences.
13. Appendix 1 (page 52) contains a "Safety Checklist" for elementary science teachers. Use the checklist as a daily guide for science safety in your classroom.
14.

Excerpted from Safety Is Elementary: the new standard for safety in the elementary science classroom, 2010, Laboratory Safety Institute. Natick, MA 01760 www.labsafetyinstitute.org.

Calendar of Events

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.ralle@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.

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 to be held in Istanbul in July 2012. 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.

For further information: http://www.wcpe2012.org/

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

from 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 leanring through science lessons in shaping their future lives.

http://www.icase2013.org

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**.

President
Dr. Ben Akpan
Executive Director of STAN, Nigeria
E-mail: ben.akpan@stanonline.org

Past President
Dr. Jack Holbrook
Professor, Centre for Science Education
University of Tartu, Estonia
E-mail: jack@ut.ee

President Elect
Dr. Teresa J. Kennedy
Professor, University of Texas at Tyler
E-mail: tkennedy@uttyler.edu

Secretary
Dr. Beverley Cooper
E-mail: bcooper@waikato.ac.nz

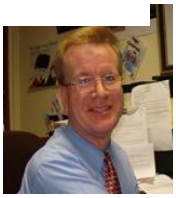
Treasurer
(to be determined)

Regional Representatives

Regional Representative for Africa
Mamman Wasugu
E-mail: mammanwasagu@yahoo.ca

Regional Representative for Asia
Azian Abdullah
E-mail: azian@recsam.edu.my

Regional Representative for Australia/Pacific
(to be determined)



Regional Representative for Europe
Dr Declan Kennedy
E-mail: d.kennedy@ucc.ie

Regional Representative for Latin America
Christiane Gioppo
E-mail: cgioppo@yahoo.com

Regional Representative for North America
Michael Padilla
E-mail: padilla@clemson.edu

ICASE Executive Committee 2011-2013

Chairs of Standing Committees

Safety in Science Education

James Kaufman

E-mail: jim@labsafetyinstitute.org

World Conferences & Environmental Education/Sustainable Development

Elaine Horne

E-mail grovesr@ozemail.com.au

Pre-secondary and Informal Science Education

(to be determined)

Publications & Website

Bulent Cavas

E-mail: bulentcavas@gmail.com

For more information about ICASE Executive Committee, you can visit ICASE Web www.icaseonline.net