International Council of Associations for Science Education

Supporting and promoting science education internationally
The ICASE Newsletter

NOVEMBER 2011

Welcome to the ICASE November 2011 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

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ICASE News

Jack Holbrook, ICASE Past President

Introducing the ICASE-MICE: An ICASE workshop in Nantes.

A two-day inaugural meting was held in Nantes and Gourunde, France to form a group of science teachers to participate in the PROFILES (professional reflection–oriented forcus on inquiry learning and education through science). The meeting was held at the end of September 2011. PROFILES is an European science education project in which the major ICASE role is support and dissemination

The program involved the teachers in reflecting on the purpose of PROFILES and the importance of student motivation and approches to inquiry based science education. The seminar introduced the unique aspect of PROFILES as being introduced to student through a 3-stage approach. Each module introduced was shown to highlight an intial scenario of local situation from which students background knowledge could be identified and the way forward seen as tackling a scientific question related ot the scenario.

The second stage was heavily related to learning the science concepts while appreciating the need for student involvement through inquiry based science education. For this, the third stage consolidate the science ideas and relates this to a beter conisderati of the intial scenario and the need for socio-scientific decision making to further enhance the relevance of the science learning.

Modules were examined and discussed. The modules were taken from www.parsel.eu with adaptations in some cases.

The PROFILES project is part of the ICASE promotion of excellence. It focuses on ways to raise the intrinsic motivation of students and thus raise interest evels of students and support the teacher. The project supports science teachers through continuous professional development and puts forward an approach (with examples) of intrinsically motivating teaching in the science subjects by means of a 3-stage teaching approach.

The participants teach in European schools within France, mainly using English as the medium of instruction. The group plans to try out PROFIlES teaching models and meet again in February 2012.

For more information please contact the editor on jack@ut.ee

Kick Off Meeting of ENGINEER

ICASE is a partner to this European Commission funded project promoting engineering in primary schools and is based on a model eminating from the Boston Science Musuem in the US. The initial meeting was held in Brussels at the end of October. ICASE will play a role in the dissemination of the project and in the development of teacher professional development materials.

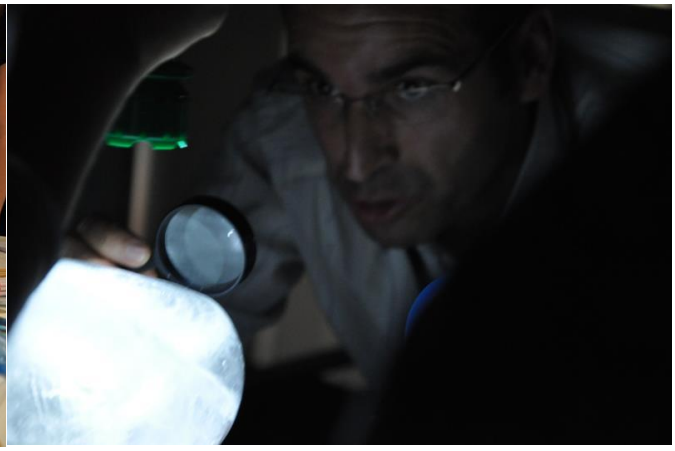
ICASE PROFILES Teacher Seminar in Turkey

The seminar was held in Cesme Altinyunus Otel in Izmir in Turkey between October, 15-16, 2011. 5 Science Educators, 2 Responsible persons from Izmir City Education Directoriat and 30 teachers from different location of Izmir attended the seminar. In order to be sure that the teachers have enough information and understand about the meaning of inquiry based science education, a series of inquiry activities were organized for the teachers. These activities were taken from the Institute of Inquiry web site. http://www.exploratorium.edu/ifi/ This useful site can be a good source for more information about inquiry activities.

The goals of the first activity were
-- to help teachers become more thoughtful about the pedagogy and instructional value of different approaches to teaching science and,
-- to enable teachers to make informed choices in matching different teaching approaches to particular learning goals they have for their students.

In the first activity, there were three different stations where the main task for teachers was to create spinning tops and learn science in three very different ways. In the first station, structured inquiry was used and all instructions were presented to the teachers. In the second activity, the teachers were guided by the instructors whenever they needed information. The last station did not focus explicitly on a particular concept. However, many concepts begin to emerge as participants created and explored tops with the available materials. In other words, open inquiry was used at the last station. By carefully analyzing and comparing different approaches to hands-on science, teachers were able to recognize and make useful pedagogical distinctions among the three different approaches. These distinctions wwere expected to help the teachers make more discriminating choices in their classrooms as they consider a broader range of learning goals and how best to meet those goals in order to better support students' learning. In the second activity, which was "Science Process Skills", there were six different stations where the main objective for teachers was to explore each process skill. In the first station, which is "a Candle", teachers observed the candle before and after it was lit and drew their observations. This activity led to recognize "observation skill". In the second station, which was "a pendulum", teachers left the ball at the end of the pendulum and observed how many it swong and drew a table of data collected. The activity led to "communication skill". In the third station, which was "Hinged Mirrors", teachers placed coins between different angled mirrors and tried to find a relationship between angles and images.

Then they tried to predict the number of images when the angle was 600. The first part of the activity led to "interpreting skill" while the second part led to "prediciton skill". In the fourth station which was "a Can of ice", teachers observed the glass with ice and wrote possible explanations about it. The activity led to "hypothesizing skill." In the fifith station which was "wet paper", teachers took the strip of paper and held it vertically in the water. They observed it for one minute. The activity led to "questioning skill". In the sixth and last station, which was "a Toy on different surfaces", teachers investigated whether the type of surface was effective for movement of the toy. The activity led to "planning skill". The goal of the third activity was to ensure the development of teachers' questioning skills. In this activity, an unknown object (a frozen balloon filled with water) was given to teachers and teachers were asked to write scientific research questions for this object, thinking as a scientist. In a section of the activity, all lights of the hall were turned off and teachers were asked to look at this object using a flashlight and to develop their questions. After that they were asked to divide their questions into two groups: "Investigable" or "Non-investigable" identifying criteria for these groups. In the next section, explanations were given about how non-investigable questions can be converted to investigable ones. As a final step, teachers were asked to find the answer to their research question using the materials given to them. In the fourth activity, which was "a Stream Table Inquiry" there were six stations. In these stations, the main objective for teachers was to gain skills for inquiry based science teaching. This activity included two activities related to erosion. In the first three stations, teachers used plastic bottles in addition to other materials in which were different size holes. In this activity, teachers proposed how to investigate the mann in which the flow affected the erosion and they were asked to draw table to record data collected. In the other three stations, teachers used wood blocks, and other materials, to investigate how slope affected the erosion and drew table to record the collected data.



On the second day of the Seminar, the PROFILES approach was explained to the teachers. Then two PROFILES teaching and learning modules was introduced to the teachers. One of the module was related to the topic of light. This module led to a decision-making activity related to ways to decrease traffic accidents. Robotics (in this activity, lego mindstorms NXT 2.0) was used, where the main science background centred on learning the reflection of the light at the grade 6 and 7 level. The activity built on prior student information such as:

- Reflection when light encounters matter
- Light can be absorbed by the matter as a result of interaction between matter and light
- More light is absorbed with dark objects.

As a final remark, the meeting was successfully completed with the help of teachers. The next teacher meeting will be December 14 and 15, 2011 and Prof.Dr.Jack Holbrook from ICASE and Prof.Dr.Miia Rannikmae from Tartu University will make a contribution discussing with Turkish teachers further ideas about implementation of the PROFILES module in the classrooms and other related pedagogical associated with motivation, relevance and scientific literacy.

For more information please contact the editor on jack@ut.ee

Student Assessment

Jack Holbrook, ICASE immediate past president

Science teachers recognise the assessment of students as an important component of science teaching. Almost certainly teachers are required to give assessment marks and make these available to students and parents, with a record being kept in the school. These marks may be distributed yearly, or on more frequernt occasions. And sometimes these marks may be converted to grades (recognizing that the accuracy of marks is suspect and that a grade level is more meaningful).

If only this was all there was to student assessment !

Alas, the role of the teachers is to implement the curriculum as intended, by whoever developed the teaching expectations. This may be solely at the school level, or in the hands of the district authority, but in many, many situations the curriculum is determined nationally and a written document acts as the major guide. This document thus offers the intended learning and it is the learnrng related to this, therefore, that is expected to be assessed for each student.

Few curricula around the world developed for science subjects see memorization of content as the sole target. What is the point of learning science facts, especially when they have been introduced in textbooks more than 100 years ago!! Luckily, somewhere in the curriculum document, it states the purpose of teaching science subjects and clearly the classroom practices undertaken by science teachers need to be directly related to this. It is not the task of the textbook to reflect the curriculum (although this would be an interesting endeavour – which, I mght add, will always fail). It is the teacher's job to focus teaching on implementing the curricum intentions and thus to determine students' success and failures in this regard. And now comes two interesting questions:

- Why is it not possible for the textbook to emulate the intentions of the curriculum?
- Is the teacher solely interested in student outcomes, or is the teacher also interested in students' progress?

If content is not the sole intention of the curriculum, then textbooks cannot emulate the curriculum. At best they can be references to students and teachers on cognitive aspects that aid the learning process. Learning that relates to skills, values and attitudes is outside the scope of the textbook. Yet, if curriculum intentions are put forward in these area, as is most likely to be the case, then student' gains in these aspects need to be part of assessment.

It is well known that students are more able to learn when provided with support and assistance (either by the teacher or classmates). But it is important to know when and in what way to apply this support, Feedback from students is thus crucial and can play an important role in students' progress and hence their learning. In recognisng that feedback is a form of assessment, the role of feedback and how it is obtained becomes important for the professional teacher.

Give the Whole Rat

James A. Kaufman, Ph.D.
Chair, ICASE Committee on Safety in Science Education

Several years ago, Jim Firebaugh, Virginia State Science Supervisor, and I were travelling around Virginia in a blue Department of Education van giving one-day seminars throughout the state. Jim is one of the State Science Supervisors in Virginia.

In one city, we stopped in a Dollar Tree Store and I found some plastic squeeze rats for one dollar each. I bought two. I'd been fond of saying that "chemistry faculty in schools and Universities in the United States, present company excluded, don't give a rat's rear for lab safety."

Why was I sayng this?
The reason that I would say this is that 90% of students majoring in chemistry and chemistry graduate students at a Boston University Career Day in a National Chemistry Week had never seen "Safety In Academic Chemistry Laboratories". These students were from institutions all over the state of New England in the US. But they had never seen the most important publication on lab safety from their professional organization, ACS.
It's a FREE, eighty-page booklet that's over 35 years old. Go online to the American Chemical Society to see free publication on laboratory safety for schools.
http://portal.acs.org/portal/acs/corg/content?_nfpb=true&_pageLabel=PP_ARTICLEMAIN&node_id=2228&content_id=CNBP_027854&use_sec=true&sec_url_var=region1&__uuid=8f1119c2-f879-40df-ba83-956cdeebdb64

Back to the rats.
People at the seminars and short courses kept asking if I would give away or sell the rats. They're very popular. One day this past summer it occurred to me that besides saying "They don't give a rat's rear (the back part of a rat) for safety," we should give the whole rat!
Explanation – Students/teachers don t think about safety, but they like the toy rats. If they get a toy rat maybe this willremind them to think about safety issues and act accordingly.

I made a small label that I attached to the rat's tale. The label says:
"Lab Safety Rat.
We don't give a rat's rear for safety. We give the whole rat. Congratulations.
You've just been 'ratted on' for working safely. Now it's your turn 'to rat' on someone else."

Too often we focus on criticizing people for unsafe acts and unsafe conditions. Here's a way to have a little fun while recognizing good performance. If you see someone working safely, you give them the lab safety rat. They need to pass it on when they see someone working safely.

"Lab Safety Rats" are available from the Laboratory Safety Institute. Or, make your own. If you do, and you're having fun with it, give us a call or an email. We'll be eager to hear about the kind of reaction it's getting at your place.

Science Literacy: An Appropriate Goal for Science Education

Robert E. Yager
Professor of Science Education, University of Iowa

Science Literacy is widely used as an important goal for science teaching. PARSEL (www.parsel.eu) used the term to indicate science reforms for every science classroom; the National Science Teachers Association (NSTA) in the U.S. lists it as a "guiding principle". But, what does it mean in practice?

Few argue against it as a goal. But, Morris Shamos, a practicing scientist (physics) and past president of NSTA, has written a whole book entitled: "The Myth of Scientific Literacy" (1995). He used himself as an example of being scientifically illiterate (based on the fact that he could not pick up an issue of "Science"; and read every article with understanding)!

While to be literate means to be able to read and write (check any dictionary in English!), to 'do science' does not begin with a book about science and then reading and writing what is included in the book -- and in English. Instead, science is exploring the natural world known by humans who seek to explain the objects and events found. And henne striving for scientific literacy in science lessons requires active student involvement.

Alas, too many teachers tell students to read a science textbook so as to be able to recite what it contains, and then to prepare answers to book/teacher questions about what the book says). Surely these actions are not acceptable for deciding if a person is "scientifically literate". It is an unfair approach to science teaching.

Anf it is not fair to students to accept Shamos' indication that science literacy is a 'false goal' – or that it opposes the very nature of science itself! If scientific litracy continues to be seen as a guiding principle, it is important to clarify what explicitly is to be done – and not done! This actually is the purpose of the curriculum.

Reference:

Shamos, M. H. (1995). The Myth of Scientific Literacy. Rutgers University Press.

PS Perhaps an interesting question is - are science teachers scientifically literate?

If scientific literacy is an important goal of science teaching, then it is crucial science teachers are scientifically literate. This does not mean, as indicated above, they understand all that is produced in the textbook. But is does mean they have an understanding of the content that they do use in their teaching, plus AND THIS IS PUT FORWARD AS BEING IMPORTANT, the capability to promote students' learning, in all aspects, as intended by the curriculum. And this promotion of students' leanring is almost certainly far more than understanding content.

And thus the question – are science teachers scientifically literate?

Fourth International Conference on Science and Mathematics Education
CoSMEd 2011 Penang, Malaysia

15-17 November 2011

Organised by:
SEAMEO Regional Centre for Education in Science and Mathematics, Penang, Malaysia

Rationale

One of the issues that confront educators today is the concern of educating young minds to meet the challenges in a globalising world. Many countries are faced with the challenge of preparing citizens who will be able to address global, national and local problems. In this regard, Science and Mathematics knowledge has become essential as they empower people to usefully apply their knowledge more effectively to solve problems. There is however a need to educate the young so that they can fully utilise the power of Science and Mathematics, taking advantage of the technologies that are available. On the one hand, it is our hope to see more children being scientifically and mathematically literate, yet on the contrary we often see children become disinterested in Science and Mathematics through the way it is taught in schools. This conference thus aims to bring educators and researchers together to discuss and address issues in improving Science and Mathematics for the 21st century; developing children's ability to think scientifically and apply Science and mathematical knowledge for personal as well as for the benefit of the community.

Objectives

The objectives of this conference are

1. To provide a forum to review issues, exchange of ideas and share experiences on the development of Science and Mathematics education at all levels.
2. To discuss developments in Information and Communication Technology (ICT) integration to improve learning of Science and Mathematics.
3. To exchange ideas on continuing professional development as a means to sustain the development of high quality Science and Mathematics teachers.
4. To encourage the sharing of knowledge, skills and experiences of experts working on new strategies to sustain Science and Mathematics education reforms in teaching and assessment.
5. To strengthen professional networking among Science and Mathematics educators both locally and globally.
6. To maintain professional contacts to enhance cooperation among a consortium of international organisations and educational institutions to facilitate greater dissemination and exchange of expertise at an international level.

For further information: http://www.recsam.edu.my/cosmed/index.html

The Association for Science Education
Promoting Excellence in Science Teaching and Learning

Science Education Research

ASE Annual Conference 2012 @ University of Liverpool

Wednesday 4th - Saturday 7th January 2012

Research Seminar Series Promoted by the ASE Research Committee

Papers or poster presentations will cover 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

Contributions come from teacher educators, teachers, higher education degree students and from colleagues involved with curriculum development and evaluation.

Contact the ASE website for more details

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. Suggestions for appropriate lectures are welcome by May 2, 2011. Please contact Dr. Silvija Markic, University of Bremen: *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*.
A second announcement will follow in Autumn 2011.
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/

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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