

Teaching the Teachers

Educator Professional Development associated with the ISWI Undergraduate Summer Schools

By Deborah Scherrer, Stanford University, and Rosa Ros, Technical University of Catalan

The key to bringing developing nations into the developed world is education, and particularly education in science, technology, engineering, and mathematics. A good place to start is with teachers. High school science educator workshops have been held in association with the ISWI Undergraduate Summer Schools for several years. We'd like to showcase 3 of them.



Indonesia Educator Workshop

Deborah Scherrer, from Stanford University, and David Rodrigues, a well-known amateur astronomer in the US, presented a full-day science educator workshop to high school teachers in Bandung, Indonesia, associated with the ISWI/MAGDAS Undergraduate Summer School, September 2012.



Focus of the Indonesia workshop was solar science and space weather topics, similar to the focus of the summer school. Activities included training in spectroscopy, experimentation with magnetism related to solar activity, and an introduction to space weather. All our educator workshops feature hands-on materials and activities. For Indonesia, we added an experimental, extensive training session on using entertainment techniques to “draw in” and engage teachers as well as their students.

LAPAN, Indonesia’s National Institute of Aeronautics and Space, organized the workshop and provided the most appropriate, actually wonderful, facilities and organizational staff we had ever seen. Presenters, staff, and teachers were even presented with their own workshop polo shirts!

35 teachers attended, and all returned assessment materials. 100% found the workshop valuable to their teaching, 91% will share what they learned with (a large number of) other teachers, and 94% will immediately use techniques and materials presented in their classrooms. (These are very high results compared to most teacher workshops.) Of the 8 primary topics, those most likely to be shared in classrooms were spectroscopy and solar magnetism. However, not surprisingly, the session attendees found most enjoyable was that on entertainment techniques.

The workshop was supported and funded by SCOSTEP (ICSU's Scientific Committee on Solar-Terrestrial Physics) and exceptionally well-organized by LAPAN staff.



Indonesian high school teachers ponder a challenge in solar magnetism



Educators construct their spectrographs

Thanks to a generous donation from Lockheed Martin Solar and Astrophysics Lab, we were able to ship class sets of punch-out spectrographs for all teachers, as well as class materials for the solar magnetism and other topics. However, thanks to a 6-week stay in Indonesian Customs, the materials did not arrive in time for the workshop. LAPAN negotiated the problem and eventually distributed materials by mail.



Sun in Indonesian is Matahari

However, consider the challenge of teaching spectroscopy and magnetism with only a few spectroscopes and magnets...

Kenya Educator Workshop

Undaunted by the previous Customs issues, Stanford's Deborah Scherrer again presented an educator workshop to accompany the ISWI/SCOSTEP summer undergraduate school held in Nairobi, Kenya in October 21 – Nov 1, 2013. (This time she carried the materials with her...) Solar scientists and lecturers at the summer school, Mark Miesch, Nat Gopalswamy, and Jesper Schou were highlighted presenters and supporters. Topics included the Sun and space weather, solar spectroscopy, solar magnetism, active engagement teaching techniques, and an overview of the SuperSID Space Weather Monitors, instruments developed at Stanford University under NSF and NASA funding and currently part of the ISWI program. The Society of Amateur Radio Astronomers, USA, generously donated SuperSID monitors for the workshop attendees.

There were 18 participants in the Kenya workshop, and assessment revealed that all attendees found the workshop very valuable, and that they learned skills, activities, and content that they could immediately take back to their classrooms.



Participants learn to use their Solar Center/Lockheed Martin spectrographs



Experimentation during a session on active engagement techniques



Nat Gopalswamy gives a presentation



Participants working with their materials

The Nairobi workshop was sponsored by SCOSTEP, with funding support from the United Nations and the summer school organizers. The workshop was graciously organized by Paul Baki and his colleagues from the Technical University of Kenya.

Network for Astronomy School Education (NASE) Workshop

Need an incredibly committed woman to run your next educator workshop? Then ask Rosa M. Ros, of the Technical University of Catalonia and past president of IAU-Commission 46 (Astronomy Education and Development). Rosa also presented a NASE 3-day educator workshop in conjunction with the Kenya ISWI/SCOSTEP summer school. Her excellent series provided hands-on activities and presentations related to stellar evolution, cosmology, Sun-Moon-Earth system, history of astronomy, and the solar system. The NASE programs are designed to train a set of members of the local community in the materials, and then have the locals train additional educators in subsequent courses. A key component is that the NASE groups attempt to organize themselves according to the local needs and curricula of, in this case, Kenya's educators.

Professor Ros was accompanied by Dr. Miryana Povic (NASE member), Susan Murabana, Dr. John Buers Awuor, Dr. Dismas Wamalwa and Mr. Goffrey Okengo members of Local NASE group in Nairobi.



Participants using a Sun-Earth model



Dismas Wamalwa showing a black hole simulator



Observing the Sun in an obscure camera



Participants repeating Herschel's experiment

NASE, initiated in 2009, is a program group of the International Astronomical Union that organizes astronomy education workshops for high school teachers. NASE materials are designed to cover a basic course in astronomy for beginners as well as

provide additional coursework and activities to teachers after the initial workshop. Wherever possible, NASE activities are carried out in the language of the teachers, with existing versions in English, Spanish and Portuguese. The course book has been published in Chinese Mandarin and translation to other languages is coming.



Participants using an eclipse simulator



Practical activities on the Nairobi University terrace

Materials in Use, Already!

Coincidentally, some days after our workshops a few of us stopped in at a local Nairobi mall for lunch. We were surprised and very much pleased to find Susan Murabana (one of the local NASE workshop assistants), sitting at a public station in the mall with her colleagues, a portable planetarium, and a table covered with materials we had given her. Go Susan!



Susan Murabana and colleagues providing astronomy resources at a Nairobi mall.

You can do it too!

Educators in developing countries find these workshops extremely valuable. When you are next hosting a conference, consider including a local educator workshop. Use your attending scientists to provide background lectures and question sessions. Then bring in trained science educators to run the workshops, or learn to use the many existing materials and teach them yourselves. It may turn out to be one of the most rewarding experiences of your life.

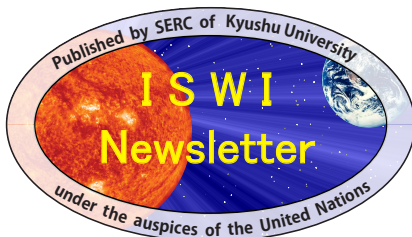
Find more resources here:

<http://solar-center.stanford.edu/>

<http://www.naseprogram.org>



*Nat Gopalswamy, Rosa Ros, and Deborah Scherrer enjoying their experience.
Paul Baki chuckles behind Gopal.*



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