Teaching the nature of science (and keeping students engaged)

A blog by Peter Ellerton, The Conversation, 28 May 2012

“Last week’s Health of Australian Science report, by the Chief Scientist of Australia Ian Chubb, has again highlighted the issue of declining student engagement in science in primary and secondary schools.

Why are we in this position? One factor is a fundamental misunderstanding, at all levels, of the “nature of science” – no small thing! We’ll get to the nature of science shortly, but first …

Declining student engagement has been a source of angst for scientists and educators for some time, and has resulted in no end of solutions being offered by no end of well-meaning individuals – solutions that include streamlining the entry of practising scientists into schools, paying science teachers more than those of other subjects and improving pre-service teacher education.”

This blog continues at http://theconversation.edu.au/teaching-the-nature-of-science-and-keeping-students-engaged-7278

Big picture view of land management opportunities on Tiwi

A group of Tiwi Island secondary students has received a "big picture" introduction to land management and how it relates to industry on the island.

Professorial debate over teaching science (Australia)

Some of the nation's top science professors have lashed out at the draft of the national curriculum saying the subject of science is being fundamentally misunderstood. The Australian Council of Deans of Science says there needs to be a revamp of the way science is taught but the draft course for high school students is misrepresenting the character and core concepts of science.

Emily Bourke, ABC – The World Today

http://www.abc.net.au/news/2012-07-10/professorial-debate-over-teaching-science/4121452

Indigenous knowledge and science: From recognition to knowledge co-production

This was one of the sessions at the Rio+20 UN Conference on Sustainable Development in June 2012 sponsored by the International Council for Science (ICSU). A report of the session is available at http://www.icsu.org/rio20/science-and-technology-forum/programme/indigenous-knowledge/indigenous-
knowledge, as well as a video of the session. The participants report “a shift away from the notion of scientific validation of extraneous knowledge and its integration into science, towards an approach anchored in the co-design of research and the co-production of new knowledge to address complex emerging challenges.”

There is reference in the report of a new resource, Weathering uncertainty: Traditional knowledge for climate change assessment and adaptation. This can be downloaded from the web at http://unesdoc.unesco.org/images/0021/002166/216613e.pdf.

**Call for Papers: Teaching Geoscience in the Context of Culture and Place**

The Journal of Geoscience Education (JGE) is soliciting manuscripts for a themed issue on *Teaching Geoscience in the Context of Culture and Place*.

**Description**

Geoscience is part of human culture. Cultural worldviews influence, and render context and meaning for the ways that we study, interpret, understand, and teach about Earth features, processes, and history. We teach geoscience in and by means of real physical localities that are also places, which become imbued with intellectual meaning and emotional significance through human experience. These values constitute the *sense of place*: a well-characterized construct that encapsulates our individual and collective connections to our natural and cultural surroundings. Indigenous and other historically rooted groups and communities typically hold rich senses of their homeland places. Their place-based systems of knowledge, referred to as traditional knowledge, traditional ecological knowledge, or indigenous knowledge, incorporate unique and intellectually significant geoscientific observations and ideas (termed *ethnogeology*). Yet these groups remain underrepresented in geoscience studies and careers, possibly because they are uninspired or even put off by mainstream content and pedagogy. Place-based and culturally informed geoscience education—presented either in formal or free-choice settings—has been advocated as a way to better engage and retain indigenous and other underrepresented students, while also appealing to and enriching the senses of place of more diverse audiences. However, rigorous evaluation of these approaches has been limited.

The wider scientific, educational, and conservation communities have also become more interested in traditional knowledge over the past two decades. The integration of Western (or Euro-American) and traditional sciences has been increasingly referenced in research literature and government reports as a model for enhanced scientific advancement, sustainable development, environmental stewardship, resource management, and multicultural literacy. Even so, the majority of professional geoscientists and educators have little understanding of the value of traditional knowledge, its cultural context, or how to approach this topic in geoscience education.

*We seek to compile a focused collection of articles that highlight current thinking, models, teaching methods, and authentic assessment of approaches for integrating place-based learning, Western and traditional knowledge systems, or multicultural issues in geoscience education.* Submission of research papers, curriculum and instruction papers, and commentaries are welcomed. Please contact the special issue associate editors listed below for more information.

**Theme Issue Editors**

Guest Associate Editor, Dr. Judy Lemus, University of Hawai‘i at Manoa, jlemus@hawaii.edu
Guest Associate Editor, Dr. Jude Apple, Western Washington University, jude.apple@wwu.edu
Associate Editor, Dr. Steven Semken, Arizona State University, semken@asu.edu
Editor, Dr. Kristen St. John, James Madison University, jge@jmu.edu

**Submission Guidelines**

The submission deadline is **December 15, 2012**, for anticipated issue publication in Summer—Fall 2013. Letters of submission should state that the manuscript is intended for this theme issue. Submissions must comply with JGE guidelines, available at http://nagt-jge.org/page/contributors.
INDIGENOUS ASTRONOMY

_Eagle Dreaming_
Paul Curnow recently revised _Eagle Dreaming_ on his website. It can be visited at: [http://www.youtube.com/watch?v=jVJoR2K0X68&feature=youtu.be](http://www.youtube.com/watch?v=jVJoR2K0X68&feature=youtu.be)

_Australian Aboriginal Astronomy_
The Aboriginal Astronomy Project in Sydney is growing and expanding. Duane Hamacher has taken a Research Fellowship position at Nura Gili, the Indigenous Centre at the University of New South Wales to continue his research in Aboriginal Astronomy ([http://www.nuragili.unsw.edu.au/profileduanehamacher.html](http://www.nuragili.unsw.edu.au/profileduanehamacher.html)). Bob Fuller is enrolled in an MPhil program at Macquarie University researching the astronomy of the Kamilaroi people in north-central New South Wales.

_Outreach & Communication_

_Development_
Duane and his astronomer-wife, Tui Britton, went to Kakadu for a week in July to trained staff of Gagudju Dreaming. The Indigenous-owned resort is now sponsoring night astronomy tours by boat on Yellow Water called “Algohgarrng”, which will cover both Western and local Aboriginal views of the night sky ([http://www.gagudju-dreaming.com/blog/post/2012/06/16/A-NEW-Kakadu-Night-Experience.aspx](http://www.gagudju-dreaming.com/blog/post/2012/06/16/A-NEW-Kakadu-Night-Experience.aspx)).

Duane also helped set-up new meteorite exhibit at Sydney Observatory, which features both scientific and Aboriginal information about the Henbury and Wolfe Creek meteorites. The exhibit includes an Aboriginal painting of the Wolfe Creek Crater (called _Kandimalal_ by the Djaru people).

_Research_
Project members are involved in a wealth of research projects. Some of these projects involve research into supernovae, aurorae, stone arrangements, Bora ceremonial sites, oral traditions of meteorite craters, Maori perceptions of meteors, and more.
Ray and Cilla Norris, Duane Hamacher, and Reg Abrahams had a paper accepted in the journal *Rock Art Research*. The paper confirms the astronomical orientations of the Wurdi Youang stone arrangement in Victoria.

Duane Hamacher, Bob Fuller and Ray Norris had a paper accepted in the journal *Australian Archaeology*, which will appear in the December 2012 issue. The paper discusses orientations of linear stone arrangements in NSW, showing that they have a preferred orientation to the cardinal points.

Bob, Duane and Ray have also submitted a paper to *Australian Archaeology* that investigates the orientations of Bora ceremonial grounds in southeastern Australia. Preprints of these papers will be available online soon.

**Blog Posts** [http://aboriginalastronomy.blogspot.com/](http://aboriginalastronomy.blogspot.com/)

- 28 May 2012: Sky-Shaping (A Poem by Michele Bannister)
- 02 June 2012: When Giant Fish Leaves the Sky
- 11 June 2012: Merlpal Maru Pathanu - Eclipse artwork in the Torres Strait
- 20 June 2012: The Dhui Dhui story

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**RESOURCES**

**Mevlana International Journal of Education**

We are happy to inform you that Volume 2, Issue1 has been published at [http://mije.mevlana.edu.tr/](http://mije.mevlana.edu.tr/)

We hope you would like to read this issue. On the other hand we are waiting your manuscripts for Volume 2, Issue 2. This issue will be published at 30 December 2012. Deadline for this issue is 30 October 2012.

Dr. Özgen Korkmaz

Editor of MIJE

**International Journal of Environmental & Science**

New issue of International Journal of Environmental & Science Education has been released. You can access its content freely from the web site: [http://www.ijese.com/currentissue.htm](http://www.ijese.com/currentissue.htm)

Dr. Mehmet Bahar

**International Journal of Multicultural Education**

International Journal of Multicultural Education has just published its latest issue at [http://www.ijme-journal.org/index.php/ijme](http://www.ijme-journal.org/index.php/ijme). We invite you to review the Table of Contents here and then visit our web site to review articles and items of interest.

Dr. Heewon Chang

Editor-in-Chief, IJME

**Articles (Peer-reviewed)**

- **English Is Not All That Matters in the Education of Secondary Multilingual Learners and Their Teachers** Kara Mitchell
- **Culturally Responsive Instruction Leaves No Child Behind: The Story of Juan, a Pacific Island Special Needs Student** Catherine Eileen Stoicoiy, Richard Fee, Julie Fee
- **Mis/Representations of Asian Americans in the Curricula: Perspectives from Second-Generation Japanese American Youth** Rachel Endo
• Education that Leads to Nowhere: Thailand’s Education Policy for Children of Migrants
Thithimadee Arphattananon

Indigenous Education Resource Update (Australia)
Issue 17, June 2012

Embedding Aboriginal and Torres Strait Islander Perspectives in schools: A guide for school learning communities (Queensland, Australia)
Supporting teachers to include Indigenous perspectives in schools has been identified nationally as a key component to ensuring improved outcomes for Indigenous peoples in Australia. This EATSIPS guide focuses on four questions for teachers: What is my role in embedding Aboriginal and Torres Strait Islander perspectives? What role do Aboriginal and Torres Strait Islander perspectives play in the curriculum for all students? How do I include the perspectives in my work? How does embedding Aboriginal and Torres Strait Islander perspectives throughout the whole school environment promote Aboriginal and/or Torres Strait Islander student success?

Ethnography & Education: Special issue on ethnography in science education
Heidi Carlone and I would like to announce the publication of a special issue on ethnography in science education in the current issue of the journal Ethnography & Education. Here is the link to the special issue. Please share these articles with your colleagues and students: http://www.tandfonline.com/toc/reae20/7/2

Ethnographies of Science Education: Situated Practices of Science Learning for Social/Political Transformation
Editors: Carol B. Brandt, Temple University and Heidi Carlone, University of North Carolina, Greensboro

Articles
Heidi Carlone & Angela Johnson: Unpacking “culture” in cultural studies of science education: Cultural difference vs. cultural production

Laura Colucci-Gray & Christine Fraser: From science as ‘content’ to science as ‘interpretive key’: experiences and reflections from a science course in teacher education

David E. Long: Evolution education in policy and practice: An ethnographic perspective

Ana Padawer: Feeding pigs and looking for güembé: Local production of knowledge about the natural world of peasant and indigenous children in San Ignacio

Irene Rahm: Collaborative imaginaries and multi-sited ethnography: Space-time dimensions of engagement in an afterschool science program for girls

Anna Traianou: Science teaching: A dilemmatic approach

Carrie T. Tzou & Philip Bell: The role of borders in environmental education: Positioning, power, and marginality

Carol B. Brandt, Ph.D.
Email: carol.brandt@temple.edu
Recent papers and books
Abstract: One way to integrate indigenous perspectives in junior science is through links between indigenous stories of the local area and science concepts. Using local indigenous stories about landforms, a teacher of year 8 students designed a unit of geology that catered for the diverse student population in his class. This paper reports on the inquiry-based approach structured around the requirements of the Australian Curriculum, highlighting the learning and engagement of the students.

Abstract: This paper examines the both-ways nature of science education courses in the undergraduate education program presented at the Batchelor Institute in 2010. Both-ways education refers to a philosophy and practice of education which merges Indigenous Australian and Western academic disciplinary traditions of knowledge. The underlying both-ways philosophy of the Institute is examined and how it was implemented in two preparatory courses (a science education course and a science content course) for primary and middle school teaching is described. The role of the author as a non-indigenous lecturer in implementing both-ways philosophy in these courses is examined using examples from his teaching and assessment. Two alternative conceptions of both-ways are identified. Firstly it is conceived as a practice related to the steps of the teaching and learning process. Secondly, it can be seen through a sociocultural lens as involving the cultural identities of the students. For the lecturer, an identity learning model enables the theorising of meaning-giving and sense-making over time, leading to effective both-ways teaching and learning.

Abstract: Are the images of science held by learners the same across cultures? What are the implications for science education? This book explores the nature of science from a cultural perspective. Located in the Chinese cultural context, the book examines the nexus between characteristics of Chinese thinking and the understanding of the nature of science in Chinese traditional culture. The dramatic cultural change as a result of the introduction of Western culture was accompanied by the dramatic reconstruction of the image of science. The Chinese science education echoes the understanding of the nature of science in each cultural historical period. Reflecting the tension and dilemmas of understanding the nature of science at the policy making level, the images of science held by Chinese science teachers represent a mixture of influences by values and beliefs that are embedded in the imported science and by Chinese native cultural beliefs. The book concludes with suggestions of change of practice in science education for a more realistic image of science not only within the field of education but also in society at large. Free Preview

Abstract: It is difficult to engage Aboriginal students with western science topics such as the Linnean zoological taxonomy. Yet, the study of local fauna is an area in which there is much local Aboriginal knowledge. This paper explores the effect of integrating Aboriginal and Western knowledge on the science learning of students in an Independent Aboriginal Community secondary school. It reports on an action research study conducted with twelve Year 8-9 Indigenous students in a Montessori classroom in which the teaching of Aboriginal and Linnean classifications of animals was integrated. The study covered 83 lessons that included Elders' narratives on local fauna and specially constructed didactic and developmental materials. Classroom observations and pre-post instruments focused on the effect of the teaching on students' pride in heritage and knowledge of culture and the Linnean taxonomy, looking for teaching actions that appeared to stimulate strong learning responses. Preliminary results reveal that the conflation of both Aboriginal and non-Aboriginal knowledge, along with an emphasis on contextualisation, combined to strengthen both the Indigenous students' Aboriginal identity and the status of local Indigenous knowledge in the science classroom. It also appeared to deepen the Aboriginal students' understanding of the Linnean taxonomy.

Abstract: A tension evident in science education conversations today from the classroom to the policy-making level across Canada, New Zealand and Australia is questioning the purpose of science education (for example, Australian Academy of Science, 2010; New Zealand Centre for Education Research, 2011). These conversations seek resolution to the question: what is the purpose of science education in schools and which of these purposes matters most? At the centre of these concerns is questioning a long held belief that science education experience should continue to primarily serve national interest for economic prosperity by preparing a small number of future scientists at the expense of engaging all young people in Citizenship Science. A question that needs to arise in this ongoing conversation is what is meant by a Citizenship Science education and, more importantly, whose interests does Citizenship Science education serve? Is Citizenship Science education just another attempt to serve a nations’ interests?
Nel Noddings asserts that the obligation of schools is to be responsive: to listen attentively and respond as positively as possible to the legitimate expressed concerns of communities (2005).

In this presentation, we draw upon our research and development work with Indigenous communities in Canada, New Zealand and Australia to critically examine the premise of Citizenship Science in light of what Indigenous communities advocate for, and the means by which we assist teachers in being responsive to Indigenous community aspirations.


Abstract: This presentation takes a narrative approach to present work in an isolated Indigenous community in the Northern Territory. The narrative charts the using of the 'big ideas' of science as a context for the development of literacy and numeracy skills in this isolated school. The presentation will highlight through a series of student activities the cultural border crossing journey of a non-indigenous science educator, indigenous teacher aides and indigenous students.

**Signals**

*Signals* is the magazine of the Australian National Maritime Museum. In its latest issue (Number 99, June – August 2012) there is a number of articles which feature Indigenous Australian themes.

- Building bark canoes: Museum-led workshops contribute to a revival and a new understanding of Indigenous canoe technology (p.12)
- Collections to connections: A museum intern works with our Indigenous Communities collection (p.18)
- On the rocks: Rock art around Australia records centuries of ships that have navigated to and in Australian waters (p.22)

Back issues of *Signals* are available online at [www.anmm.gov.au/signals](http://www.anmm.gov.au/signals) but the latest issue was not yet online.

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**CONFERENCES**

**9th International Conference on Hands-on Science (HSCI'2012)**

Antalya, Turkey
17-26 October 2012

The 9th International Conference on Hands-on Science (HSCI'2012) including 1st Children Summit on Science and Environmental Education (HSCI-EE) will be held on 17th - 26th October 2012 in Antalya, Turkey.

For further information on the conference please visit [www.hsci2012.org](http://www.hsci2012.org)

**2013 NARST Annual International Conference (National Association for Research in Science Teaching)**

Wyndham Río Mar, Río Grande, Puerto Rico
6-9 April 2013

CALL FOR PROPOSALS – closes 15 August 2012

**Theme—“The S in STEM Education: Policy, Research and Practice”**

We encourage NARST members to align their proposals, wherever it is conceptually feasible, with the 2013 NARST theme that focuses on the “science” in STEM education, and perhaps the state of the science of STEM education. Although there is no universally agreed upon definition of STEM education, one that may
be useful as a starting point is: “an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering and mathematics in contexts that make connections between school, community, work, and the global enterprise, enabling the development of STEM literacy and with it the ability to compete in the new economy” (Tsupros, Kohler, & Hallinen, 2009). The idea of STEM education is forward looking, but also invites examination, examples, and critique.

Program Strands
The 2013 NARST program will feature sessions focused on 15 Program Strands and delivered in several session formats. Persons wishing to be on the program in Rio Grande, Puerto Rico must identify the strand that most closely aligns with their proposed topic.

For more information visit the conference website, https://www.narst.org/annualconference/2013conference.cfm.

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CALENDAR OF EVENTS

This is mostly a summary of upcoming conferences. More details may have been given in this or previous bulletins as shown. A web-based contact is usually included. Inclusion of conferences in this list is not to be read as an endorsement of the conference.

**2012**

**September 2012**
21-23 September: Oceania Society for Conservation Biology conference, Charles Darwin University, Darwin, NT. (www.oscb2012.org) (June12)

**October 2012**
12-15 October: International Conference on Science Education 2012 (ICSE2012, Nanjing, China) Nanjing University, Nanjing, China http://edu.nju.edu.cn/zbh/icse2012/ (April12)

17-26 October: 9th International Conference on Hands-on Science (HSCI'2012) including 1st Children Summit on Science and Environmental Education (HSCI-EE), Antalya, Turkey (www.hsci2012.org) (June12)

18-20 October: 2012 IHPST Conference, Seoul National University (SNU), Seoul, South Korea http://ihpst2012.snu.ac.kr (June12)


**November 2012**

24-27 November: 2nd STEM in Education Conference, Beijing China (http://stem2012.bnu.edu.cn/cfp.html) (June12)
December 2012
5-7 December: The 2012 National Indigenous Health Conference, Gold Coast, Queensland
(http://www.indigenoushealth.net/) (June12)

2013

January 2013
7-11 January: epiSTEME 5: Fifth International Conference to Review Research on Science, Technology and Mathematics Education. Homi Bhabha Centre for Science Education, TIFR, Mumbai, India
(http://episteme5.hbcse.tifr.res.in/) (June12)


April 2013

July 2013
2-5 July: ASERA Conference 2013, Te Papa Tongarewa, Wellington, NZ

CONASTA 62: Melbourne, Vic.

September 2013
29 September – 3 October: 4th World Conference 2013, Kuching, Sarawak, Malaysia
(http://www.worldste2013.org/) (April12)