

STEM Education forum:

Putting STEM Education under the microscope

Wednesday 19 October, 2-6.30pm
Deakin University Burwood Corporate Centre
Level 1, Building BC, 221 Burwood Highway, Burwood

Sponsored by the Science, Technology, Engineering and Mathematics Education (STEME) program of Deakin's Research for Educational Impact (REDI) centre

STEM Education has become a major policy priority in Australia and internationally, and there is growing interest in inter-disciplinary curriculum versions of STEM.

Policy drivers for this emphasis are various, but their interrelations are not clearly articulated. They include national economic needs, engagement of students, and workplace relevance through STEM-specific and 'soft' skill development. Questions are also raised about the coherence of what is practiced in schools under the inter-disciplinary STEM banner, and its relation to existing school subjects, and progressive agendas in disciplinary education.

The STEM education forum provides an opportunity for science and mathematics educators to critically examine current trends in interdisciplinary and disciplinary STEM Education, challenges associated with crossing boundaries between the STEM disciplines, issues of policy and practice, inclusion/exclusion, and opportunities to make STEM a conduit for productive curriculum change.

Featuring input from leading international scholars in STEM Education the forum will be organised to maximise discussion aimed at clarification of a key curriculum issue for Australian STEM Education.

Featured speakers:

- Professor Julian Williams, University of Manchester
- Professor Richard Lehrer, Vanderbilt University
- Professor Peter Fensham, Monash University
- Professor Günter Törner, Universität Duisburg-Essen

The forum will aim to generate significant insight and commentary on contemporary advocacy of STEM in Australia. It is envisaged that the forum will generate a set of issues and principles that will contribute significantly to the STEM policy and practice debate, from a teacher education perspective.

Questions to be addressed by the forum:

- What are the key drivers of the STEM curriculum agenda?
- What are the productive possibilities opened up for enlivening curriculum in the STEM subjects?
- What are the challenges and opportunities for science and mathematics subject disciplines?

Discussions will continue over canapes and drinks after 5.30pm.

REGISTRATION: By email to keshia.jacotine@deakin.edu.au before 5.00pm 11 October



PROGRAM

Introduced by Alfred Deakin Professor Russell Tytler, and Dr Linda Hobbs, Director of the 'Successful Students: STEM' program, the forum will be contextualised within current Australian policy rhetoric, pointing to productive possibilities, ambiguities and contradictions in contemporary STEM advocacy. A summary of current STEM policy and practice settings arising from the STEM Education Conference (held in Geelong, October 5-7) will also be presented.

The featured speakers will provide provocations for substantial discussion within the forum:



Professor Julian Williams

Professor of Mathematics Education at The University of Manchester

Situating STEM within a Funds of Knowledge perspective on problem solving

Although I have been critical of the Funds of Knowledge project perspective because of its misunderstanding of capital, it might offer a context which marries both (i) the bridging of academe with home, community, and work contexts, and (ii) problem-solving from the learners own life-world. I will draw on examples, such as that of 5-year old Rico's photograph of his aquarium, and his identification of the home-mathematics of 'the shape of a fish' for inspiration.

Then there was Bobby George, our famous darts player, who eventually was forced to work out the odds to avoid excruciating embarrassment at the oche. What would a STEM curriculum look like if it took seriously Rico's home knowledge or Bobby's professional identity? Finally, how might we conceptualise the 'disciplines' in STEM in a way that would help such a curriculum?



Professor Richard Lehrer

Frank W. Mayborn Professor of Education at Vanderbilt University

Perspectives on Integrating Elementary STEM Education

An integrated elementary STEM education is often advocated as creating opportunities for interdisciplinary learning. For instance, projects in engineering design may include forays into science, mathematics, and technology.

These forms of integration are intuitively appealing because they seem "relevant," but as implemented, they often obscure valuable distinctions in disciplinary ways of knowing. An alternative form of integration bootstraps interdisciplinary learning by establishing bridges between STEM disciplines while retaining their epistemic signatures. I illustrate how engaging

children in developing mathematical systems supports their efforts to model natural systems, preserving each discipline's (math, science) values while establishing a productive synergy.



Professor Peter Fensham AM

Emeritus Professor of Science Education at Monash University

An historical perspective on STEM as a schooling goal

The international emergence of STEM as a goal for the 21st Century school science seems to be inexplicably associated with the demand for the skills that workers, at large, will need to have for a competitive national economy.

These skills are generally, at least in Science among the STEM subject areas, not being currently emphasised.

This societal demand challenges school science at a time when it is still coming to terms with the demand for public scientific literacy. An historical perspective will be used to discuss these and other purposes for school science and to

suggest how and when they, if seriously intended, can find expression in the years of schooling.



Professor Günter Törner

Professor of Mathematics at Universität Duisburg-Essen

Business communities supporting STEM innovation in German schools

Professor Günter Törner reports on a German STEM (which translates as MINT in German) initiative of the business community designed to promote mathematics and science in high schools - the MINT-Excellence Centre (MINT-EC).

The MINT-EC is mainly formed by industry and employers, and is running a network of 250 schools in which STEM is presented through a variety of activities. The schools receive some financial support to assist each other, and to start initiatives by themselves. Further, MINT-EC is providing projects overarching the work in the 16 provinces. Each year there is

a joint meeting of representatives of these schools where there is something like a market of ideas. Importantly, the principals of the schools are invited and acknowledged, and are provided with training in areas of THEIR interests by German companies. Thus MINT-EC schools are professional learning communities where principals are included and specifically addressed.

