Welcome from the Project Leader

Welcome to the first edition of the STEM Ecosystem Project newsletter. The STEM Ecosystem Project is a two year project funded by the Office of Learning and Teaching (OLT). The multidisciplinary project team is drawn from RMIT University, the University of Queensland, the University of Sydney and the University of Southern Queensland. We are very fortunate to be assisted by an experienced Reference Group from academia and industry.

Professor Julianne Reid  
Deputy PVC, Learning and Teaching RMIT University, Project Leader STEM Ecosystem Project

Meet the Team

L-R: Bel Kennedy, Ian Currie, Julianne Reid, Phil Poronnik, Alan Bradley, Tricia McLaughlin

Summary of the Project

The disciplines of Science, Technology, Engineering and Mathematics (STEM) are critical for national productivity and global competitiveness. Demand for tertiary graduates with cross-disciplinary STEM skills will continue to exponentially exceed supply in Australia in the next 25 years. Leadership in the promotion of STEM cross disciplinary learning and teaching is critical to the development of future graduates.

This project creates a STEM ecosystem that will transform the learning experiences of students and provide direction and leadership opportunities for the staff in STEM disciplines at a diverse range of universities. The STEM ecosystem will expand cross-disciplinary learning opportunities through the introduction of workshops that connect industry, staff and students in emerging industry focussed STEM initiatives. The ecosystem will create leadership for staff and engage students at all levels through reliance upon the interdependence of all members. By invigorating and encouraging new cross-disciplinary projects in STEM disciplines this project raises the bar on the current work-integrated learning projects, their delivery modes and leadership. Through industry role modelling, it empowers and nurtures capacity in tertiary staff and provides opportunities for advancement of the scholarship of learning and teaching in STEM.

Project Outcomes

Our intended project outcomes are:

- Increased capacity of STEM academic staff to design, develop and lead industry-relevant cross-disciplinary courses.
- The formalised engagement of STEM discipline learning and teaching staff to the Ecosystem.
- Increased number of STEM staff-initiated cross-disciplinary learning and teaching projects.
- Improved understanding and awareness of specific learning and teaching strategies to maximise the outcomes for students engaging in STEM cross-disciplinary projects.
- A learning and teaching repository of cross-disciplinary STEM resources.
- Improved national and international connectivity and leadership for STEM teaching and learning academic staff and the STEM Communities of Practice.
- Embedding of cross-disciplinary teaching and learning strategies in discipline curriculum.
Cross-disciplinary learning and teaching project at RMIT University

**RMIT team tackles clean water problems in Bangladesh**

Tricia McLaughlin, Project Team Member, STEM Ecosystem Project, RMIT University

More than 3.4 million people die each year from water sanitation and hygiene-related causes. Nearly all deaths, 99 percent, occur in the developing world. Lack of access to clean water and sanitation kills those most vulnerable in the third world communities, especially children. Of the 60 million people added to the world’s towns and cities every year, most move to informal settlements (i.e. slums) with no sanitation facilities.

With 780 million people worldwide lacking access to an improved water source (or approximately one in nine people in the world), leadership in innovation, design and cross-disciplinary skills are required to present economical, viable community-based solutions.

Building a skills ecosystem to address these solutions for Health Habitat (an international health NGO) has been the focus of a cross-disciplinary team of RMIT students, staff and industry. The group have combined their skills and talents in a sanitation project which will feature as part of the Water Innovation Challenge and Conference to be held in Singapore in June, 2014. The project team, consisting of staff and students from the School of Aerospace, Mechanical and Manufacturing Engineering, the School of Vocational Engineering, School of Applied Science, School of Media and Communications and the School of Civil, Environmental and Chemical Engineering, will present their design concept for an innovative clean water and sewerage system for a Bangladesh community.

The team has spent many hours this semester developing their concept within the strict guidelines of the brief and are confident of success. Over the three day period, the team will be in competition with designs from the USA and Singapore.

“This is a fabulous opportunity to represent RMIT and also apply real-life STEM skills in a team environment with students, staff and industry from other disciplines,” said team member Nurul Driver, a systems engineering student.

The team will present their documentation in a 15 minute session to judges from Habitat, Worldskills and international water and engineering representatives at the Conference. The winning concept will be further developed by Habitat Health and implemented in Bangladesh in 2015.

This project is being trialled as part of the STEM ecosystem OLT funded project, which aims to allow tertiary students from different disciplines to work together in a problem-based learning environment. The range of skills represented in the group allows for real collaboration and learning and fosters an appreciation of future graduate working conditions in a team environment. The six students will all be given credit for their various RMIT courses through a negotiated assessment arrangement with their teachers and lecturers.

**STEM Fast Facts**

- Not enough students are graduating with STEM backgrounds to fill the open positions in the market place
- During the last decade, the United States demand for scientists and engineers is expected to increase at four times the rate for all other occupations
- More than half of teens would be more interested in STEM simply by having teachers who enjoy the subjects that they teach

(Reference: http://stemcareer.com/stem-fast-facts/)
STEM learning and teaching leadership at the University of Sydney

A University ecosystem to tackle lifestyle diseases

Phil Poronnik, Project Team Member, STEM Ecosystem Project, University of Sydney

Obesity, diabetes and cardiovascular disease are an ever-increasing socio-economic burden that are truly wicked problems. Strategies to ease this burden require collaborations in interdisciplinary research and education that can translate into real-world solutions. The University of Sydney has created the Charles Perkins Centre (CPC) to collect skills and knowledge across the campus to tackle these problems. We now realize that to solve them we need to understand how our biology interacts with our environment, to explain how our risk of disease is affected by psychological, cultural, educational and economic circumstances, or external factors such as the built environment, the agricultural and food industries, technology and media. It is this philosophy that drives the mission of the CPC.

At the heart of this project is the new CPC Hub, a $400 million research and teaching facility that is a physical manifestation of institutional commitment to this vision.

The formation of the CPC is an excellent example of a skills ecosystem approach in a tertiary setting. By its very definition, the CPC is emerging as a supportive host environment and catalyst for new ideas by providing bridges across traditional disciplinary silos. The model provides the sustainability to ensure ongoing nourishment and cross-fertilization of ideas as it establishes its own independent identity. Importantly, this ecosystem spans the whole fabric of the university, from undergraduate students to the senior researchers, including the technical and administrative support staff. Thus it provides an optimal mentoring and leadership training in an innovative and stimulating environment. It is the CPC that will form a case study to be explored and evaluated in the current OLT STEM Ecosystem project.

Phil Poronnik is a Professor of Biomedical Science (Educational Strategy) at the University of Sydney. Phil has an established track record in academic leadership at the “coalface”. His leadership in science education includes being the founder of Collaborative Universities Biomedical Education Network (CUBEnet) with the Australian Academy of Science.

Meet the Project Team

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