

## Solving wicked sustainability problems: What specific knowledge and skills do students need to have to solve modern sustainability issues and those of the future?

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### BACKGROUND

With increasing pressures of climate change, environmental impact measurement, resource efficiency, material intensity, risk management and triple bottom line reporting, young engineering graduate students are increasingly being challenged to provide a skill set that meets the challenges of a changing world.

Whilst the challenges for sustainability engineering education are many, increasing focus is being given to problem based learning approaches and the need to provide learning outcomes that meet the changing needs of the profession.

The workshop will focus on providing answers to the following questions:

- What are the sustainability problems that engineering students will need to solve in the workplace and
- What do engineering students need to demonstrate in terms of sustainability/ environmental management and assessment skills in order to solve these problems?

The workshop will be run by members of the Sustainable Engineering Education Network (SEEN). It is a follow up workshop to the SEEN workshop run at the A2E2 2013 conference in Melbourne.

### TARGET AUDIENCE

The workshop will be suitable for all engineering academics and for professional staff with responsibilities for engineering education particularly those involved in sustainable engineering, engineering systems and engineering practice.

### METHOD

It is envisaged that the workshop will run for 3 hrs and be based on the following outline:

- Audience- Delegates involved and interested in sustainable engineering course development/content/ assessment and learning outcomes.
- Delivery- Based on a workshop model with introduction, group work, discussion and conclusions/outcomes from the workshop.

Activity	Duration (mins)
Robin King will present an overview of the workshop and desired outcomes .	10
Roger Hadgraft will present the concept of a sustainability engineering challenge and suggest potential groupings for the workshop groupings by discipline	10
Participants will then select the discipline that they represent and move into groups for discussion on engineering sustainability problems and the skills that will be necessary in solving these issues.	40
Each group will focus on a number of questions involving sustainable engineering education and the ontological, pedagogical/epistemological and content implications for current engineering degrees with a particular focus on the required development of the necessary knowledge, attitudes and skills necessary to solve these problems	50
Group leaders will report on the main lessons from the group discussions to all participants	40
Workshop wrap discussion and summary	30

# WORKSHOP

## INTENDED LEARNING OUTCOMES

Every participant will become more aware of the sustainable engineering content being covered by many universities and the emphasis these issues are receiving in current sustainable engineering education curricula frameworks and content. The workshop is also intended to give participants an opportunity to assess the capability of their programs in providing the necessary knowledge and skills necessary to solve challenging sustainable engineering problems.

## PRESENTERS

Prof. Robin King was pro vice chancellor for IT, engineering and the environment at the University of South Australia from 1997 – 2007. Since then Robin has led and contributed to several national engineering education initiatives through roles with the Australian Council of Engineering Deans, Engineers Australia and the Academy of Technological Sciences and Engineering.

Prof. Roger Hadgraft is Deputy Dean, Learning and Teaching, School of Engineering and Technology at Central Queensland University. He has particular interest in problem based and project based learning in engineering education. He is currently investigating the potential for a sustainability challenge like those run by EWB with a specific focus on a systems approach to engineering decision making for sustainable engineering outcomes.

A.Prof. Michele Rosano is the Director of the Sustainable Engineering Group at Curtin University. She has been involved with the development of the Sustainable Engineering Education Network (SEEN) nationally and is currently working on an OLT grant application to develop and promote sustainable engineering education in Australian Universities.

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