

Blended Learning in Labs & Lessons Symposium 2019

Complex Problem Solving & Self-regulated Learning

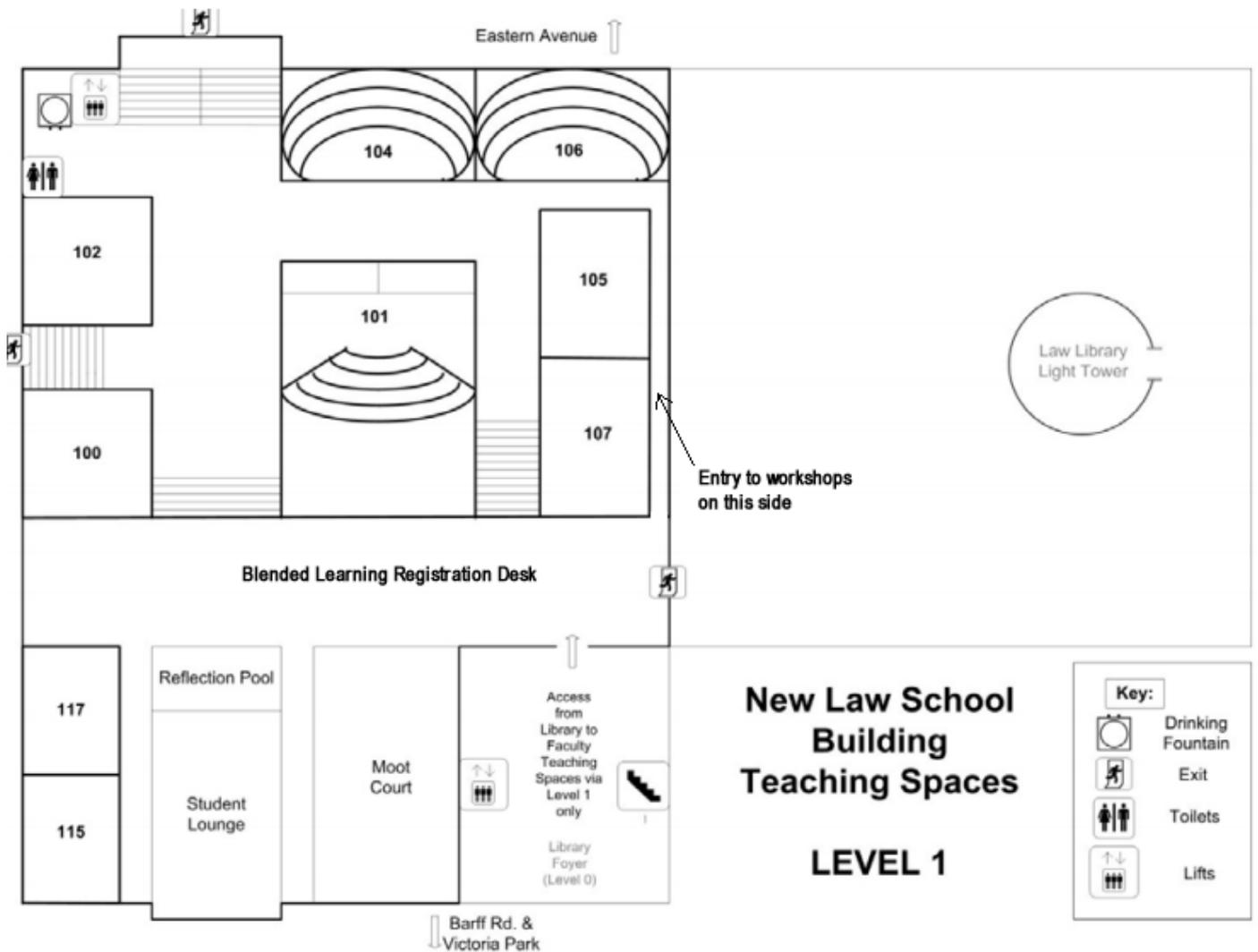


Program

- 8:45 am **Registration opens** – Level 1, New Law Annexe, Eastern Avenue Mall
- 9:00 am **Interactive Lt Demonstration** – Seminar room 100
ADInstruments will demonstrate their online learning platform Lt and its use across a variety of teaching contexts. There will be opportunities to ask questions and if time permits a chance to explore Lt yourself on your own device.
 Liam Farley, ADInstruments
- 9:30 am **Session 1: Lecture Theatre**
Opening & Welcome to Country
- Keynote Presentation: Complex Problem Solving**
 Jane MacMaster, Ponder Enterprises Inc.
- 10:20 am **Morning Tea** – Seminar room 102
- 10:45 am **Session 2: Lecture Theatre**
- Keynote Presentation: Scaffolding self-regulated learning behaviours**
 Dr Kay Colthorpe, University of Queensland
- 11:25 am **A framework and language to improve learning when managing and solving complex problems**
 Assoc. Prof Keith Willey, University of Sydney
- 11:50 am **Creative, scaffolded approaches to Reflection for Learning**
 A/Prof Kate Lloyd & Dr Kathryn McLachlan, Macquarie University
- 12:15 pm **Lunch** – Seminar room 102
- 1:00 pm **Session 3: Workshops** – Choose from one of the following.
- | | |
|--|---|
| A: Complex Problem Solving Strategies
Jane MacMaster
Seminar room 105 | B: Scaffolding self-regulated learning behaviours
Kay Colthorpe
Seminar room 107 |
|--|---|
- 3:00 pm **Closing Presentation:** Lecture Theatre
Teaching, Learning, Understanding
 Emeritus Professor Tony Macknight, ADInstruments
 2015 American Physiological Society, Claude Bernard Distinguished Lectureship Awardee
- 3:20 pm **Networking Drinks**

Blended Learning in Labs and Lessons Symposium 2019

Street level main entrance on Eastern Avenue is Level 2. Participants will need to take the stairs or lift down to Level 1.



PRE-SYMPOSIUM SESSION

Interactive Lt Demonstration

Liam will demonstrate ADInstruments' online learning platform **Lt** and explain how it can be used in a variety of teaching contexts. There will be opportunities to ask questions and if time permits a chance to explore Lt yourself on your own device.

Liam Farley (ADInstruments) *Liam completed a Masters in Physiology at the University of Otago, coincidentally where Prof Tony Macknight worked and where ADInstruments was 'born'. During this time Liam used ADInstruments hardware and software as a student. While studying Liam developed a strong*



interest in education and went on to be a Teaching Fellow and to again use ADInstruments hardware and software, though this time as an educator. It was a natural progression for Liam to move down the road to ADInstruments to take up a position in the Content Team as an Instructional Designer. 18 months ago Liam stepped into the Customer Success Manager role where he still remains today, working with educators to achieve theirs and their students' goals.

KEYNOTE PRESENTATION

Complex Problem Solving

Complex problem solving is increasingly being cited as one of the most important skillsets we need this Century. But there is not much practical guidance available on what complex problem solving is, how to teach it and how to do it. This presentation and workshop will explore what complexity means, what an effective approach for grappling with complex challenges entails, and some techniques for complex problem-solving that are accessible, practical, systematic and transferrable.

Jane MacMaster (Ponder) has qualifications in engineering, international relations and training and assessment. She runs Ponder Enterprises – an organisation that works with the public sector, private sector, NGOs and academia to build complex problem solving capabilities and to help design strategies to achieve outcomes for complex real-world challenges. She designed an approach for



complex problem solving after recognising a growing need for these skills and an absence of a practical model for teaching and 'doing' it. The approach brings together the rigour of aerospace system design together with insights from complexity science for coping with the uncertainty inherent in complex challenges, as well as many other useful ideas from a range of disciplines. She has worked as a senior adviser in strategic policy unit of the Department of the Prime Minister and Cabinet, as an aerospace systems design engineer for a global aerospace company, and as a management consultant in the financial services sector.

KEYNOTE PRESENTATION

Scaffolding self-regulated learning behaviours

Students at university need to rapidly develop the skills to become independent learners and adapt their learning strategies to suit the university environment. To achieve this, they need to proactively self-regulate their learning. Self-regulation implies that learners become aware of their learning, and make motivational and behavioural adjustments to more effectively gain knowledge. Research over the past 20 years led to the development of a well-established, three-phase cyclical model of self-regulation that includes forethought, performance, and self-reflection phases. However, in evaluating undergraduate science students' self-regulatory behaviours, we found that although they have tried a wide range of learning strategies, they rely on few, and these tend to be from the performance phase. Consequently, our research group developed a method to help students to regularly reflect on their knowledge and learning processes, and to improve the quality of their self-regulation. In evaluating subsequent behaviours, we found a significant relationship between students' use of higher quality strategies and academic achievement. Potentially, prompting them to engage in higher-quality strategies may increase students' awareness of their own learning and improve outcomes. As universities move to increasingly adopt blended learning environments, the demands on students to independently manage and self-regulate their learning also increase. To support them in this process, educators need to develop and adopt methods to scaffold the development of students' learning skills. By doing so, we will enable students to adapt to and succeed in this new learning environment.

Dr Kay Colthorpe, PhD is a Senior Fellow of the Higher Education Academy and a Teaching Focused Senior Lecturer in the School of Biomedical Sciences at the University of Queensland. She was recently awarded the 2018 UQ Award for Teaching Excellence. Her teaching is underpinned by the conviction that high impact learning experiences occur when students develop a deep understanding of their knowledge



and learning processes. She uses an evidence-based approach to design innovative curricula, engaging inquiry-based laboratory classes and inventive assessment tasks to create an effective learning environment and support student learning. An example of this is the novel 'meta-learning' assessment tasks. These tasks provide students with opportunities and prompts to critically reflect on both their understanding and learning behaviours, helping them to develop into highly self-reflective and independent learners. Kay is also a prolific pedagogic researcher, focusing on assessment, feedback, and student metacognition in the sciences. She leads the Biomedical Education Research Group, has supervised 15 honours and 3 PhD students, and has published widely on metacognition of learning, scientific skill development and blended learning.

PAPER PRESENTATIONS

A framework and language to improve learning when managing and solving complex problems

Real world projects are often complex in that they require professionals to use judgement, managing multiple possibilities, competing demands and having to make assumptions to develop considered and reasoned solutions. Hence, to authentically develop students' problem-solving critical thinking and professional skills, they need to learn to manage complexity. Learning that challenges and stretches students, asks them to think critically or use their judgement to deal with uncertainty and complexity often induces resistance. Complexity often challenges students' feelings of competence, inhibiting their learning motivation and interest in addressing and benefiting from complex learning activities. In this presentation I will introduce a learning language and framework, developed from the Cynefin framework, to work with complexity for instructors and tutors (to scaffold, articulate and model learning methods and expectations), students (to be able to discuss, evaluate their competence and understand their learning) and for instructors, tutors and students to co-construct their understanding of learning outcomes and the expected academic standards.

A/Prof Keith Willey (USYD) is the Leader of the Integrated Engineering Program and Co-director of the Faculty of Engineering Educational Innovation Unit at the University of Sydney. He began his academic career after 20 years in the Broadcast and Telecommunications industry. Keith an Australian Learning and Teaching fellow and

Principal Fellow of the Higher Education Academy has received multiple awards for teaching and research, and is a facilitator of the annual Australasian Association for Engineer Education Research Winter School.



Keith's commitment to developing high quality teaching and learning practices is supported by his educational research. His research interests include the learning and assessment associated with working collaboratively and in teams, developing student's judgement and professional identity, authentic assessment, the impact of assessment, self and peer review, collaboration, feed-forward and learning language on student's competence, motivation, learning and development.

Keith led the development of the collaborative learning and self and peer assessment software tool known as SPARK^{PLUS} that has been used worldwide by academic staff to facilitate learning activities for over 600,000 students.

Blended Learning in Labs and Lessons Symposium 2019

Creative, scaffolded approaches to Reflection for Learning

Reflective practice can support transformative learning (Mezirow, 1991) and skills development including metacognition, creativity, and life-long learning (Harvey, et. al. 2010). While we cannot assume that students and teachers have developed a capacity for reflective practice, we do know that the development of reflective practice skills can be scaffolded and taught (Coulson & Harvey, 2013). This presentation gives a short overview of key concepts developed by the Reflection for Learning Circle and outlines the key theoretical approaches that underpin reflective practice, the role of reflection for learning, and how students and teachers can be scaffolded to develop their reflective capacity. A suite of scholarly based reflective activities and resources to support reflection for learning are introduced. The evidence that supports each of these activities is also shared. In addition to traditional text-based approaches, these resources 'move beyond the diary' (Harvey et al. 2016) to include a range of modes, including arts-based, embodied, mindful and technological biofeedback approaches.

A/Prof Kate Lloyd (MQ) is the Academic Director of Learning, Teaching and Research for the Professional and Community Engagement (PACE) program at Macquarie University which received the AAUT award for programs that enhance student learning. Through her role she has contributed to the PACE objective of enhancing community-university relations through transformative learning and teaching, research and community service and engagement. Kate's work focuses on projects which take an applied, action-oriented and collaborative approach to research characterised by community partnerships, co-creation of knowledge and an ethics of reciprocity. She holds an ARC Discovery grant (2019-2021) on Intergenerational communication of Indigenous knowledges and has held an OLT grant on co-creating curriculum with PACE international partners in Cambodia, Vietnam, Malaysia, Philippines, India, Fiji, Indonesia and Peru. Kate is also passionate about innovative teaching, curriculum development and course design in the area of experiential and work integrated learning. She has led research on reflective practice as a research and teaching method and is part of the Reflective Practice Learning Circle whose work is underpinned by (i) creative efforts to curate, and design, innovative approaches to reflection, and (ii) reflective exploration of our own practice, as teachers and learners.



Dr Kath McLachlan (MQ) received her PhD, on the importance of critical self-reflection for community development workers, from the University of Qld. For the past six years Kath has worked as the Academic Director of PACE (Professional & Community Engagement) in the Faculty of Human Sciences at Macquarie University. Kath has been responsible for the successful development, implementation and scalability of the PACE program over that time. Kath has an extremely strong background in the community development sector, particularly in regional settings, as a Practitioner, Educator and Researcher. She believes that participatory approaches build the capacity of individuals, organisations and community, whereby people work and learn together for mutual benefit. Over this time Kath has also taught, researched and engaged in reflective processes, as a critical aspect of learning and teaching, and professional practice, and as a way of developing and building team capacity and cohesion. She has worked collegially to develop and refine a suite of reflective practice resources, and collaboratively delivered workshops on creativity and reflection, both nationally and internationally.



WORKSHOPS – Please choose one of the following:

Workshop A: Complex Problem Solving

Facilitator: Jane MacMaster, Ponder Enterprises

Seminar Room 105

Workshop B: Scaffolding self-regulated student learning behaviours

Facilitator: Dr Kay Colthorpe, University of Queensland

Seminar Room 107

Blended Learning in Labs and Lessons Symposium 2019

WiFi: UniSydney-Guest

Username: newlawlearning

Password: blended2019

Teaching, Learning, Understanding

Emeritus Professor Tony Macknight was integral to his son Michael's development of the PowerLab data acquisition and analysis systems. During a distinguished teaching and research career, including postdoctoral research at Harvard Medical School and appointment as Professor of Physiology at the University of Otago, Tony was aware of life science's need for an improved method of recording and analyzing physiological signals. Now retired from fulltime teaching and research, Tony continues to act as a scientific consultant to



ADInstruments. This includes travelling worldwide to consult about the company's products with leading life science researchers and educators and ADInstruments staff. Tony has been awarded an MBChB, PhD and MD, and is currently a part-time Professorial Research Fellow at the University of Otago. In 2015, he received the American Physiological Society, Claude Bernard Distinguished Lectureship Award. He is now finishing "Understand your Physiology", that provides a complete, active learning, cloud-based coverage of Physiology that is designed to provide the online component of a blended learning program.