

## **Title: Computer-mediated collaborative learning in large first-year STEM classes facilitating interdisciplinary scenario-inquiry tasks**

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Gwen Lawrie (PhD, BSc App Chem, GDip Ed) is a Senior Lecturer in the School of Chemistry and Molecular Biosciences at the University of Queensland. She transferred to a teaching-focused appointment in 2008 from a bench chemistry research background and is currently a 2012 UQ Teaching Fellow. Gwen was a 2010 CASTL (Carnegie Academy of the Scholarship of Teaching & Learning) Institute Scholar and leader of two ALTC T&L projects. Her teaching and learning projects to date have addressed the diversity and engagement of students through collaborative inquiry tasks and technology enhanced active learning environments.

### **Kelly Matthews**

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Kelly Matthews is currently a Lecturer in Higher Education in the Teaching and Educational Development Institute, and is completing her PhD. Her research involves practical applications into contemporary higher education issues including undergraduate curriculum reform, and evaluation of teaching and learning initiatives. Her interest in undergraduate science students' quantitative skills involves research into the interdisciplinary nature of science and mathematics including interdisciplinary curriculum development and subsequent student learning outcomes. Kelly is involved in a range of [teaching and learning projects](#) through a network of local, national and international collaborations, and she [publishes](#) in the area of Science and Mathematics Higher Education.

## **Intended audience and degree of expertise/past experience required**

Lecturers, course coordinators and secondary teachers who have an interest in assessment of collaborative learning environments, particularly in large classes/sections, will find this session of great interest. Strategies for managing collaborative groupwork while evidencing individual contribution are shared including effective peer assessment. Participants who are interested in promoting interdisciplinary thinking in their STEM classes are also encouraged to attend. No past experience is necessary to engage in this workshop.

## **Statement of objectives for the workshop**

Interdisciplinary scenario-inquiry tasks (IS-ITs) have been developed to both enhance engagement and address the diversity of abilities and interests common to large, undergraduate first year chemistry cohorts at UQ. Facilitation and assessment of these self-directed tasks in large-enrolment courses is too complex and time-consuming for a single academic course coordinator to manage manually; hence, interactive Collaborative Assessment System (iCAS – a computer-mediated task-management and assessment system) has been developed to achieve these processes. iCAS facilitates flexible group formation enabling promotion of student investment in both the process and outcomes of the task. Interdependency within groups has been generated by combining an individual research quest, which requires students to generate information files, with a collaborative challenge which relies on integration of all the individual sets of information to generate a collective product. The objectives of the workshop are to:

- engage participants in the pedagogical challenges of implementing tasks of this nature to maximize and measure learning outcomes.
- share strategies for group formation and interdependence.
- consider assessment of collective written products for evidence of interdisciplinary thinking and higher level learning outcomes.
- manage effective peer assessment and feedback through a task management technology.

Facilitators will lead collaborative activities and discussions to demonstrate the multiple factors that integrate to make these tasks viable including. Outcomes of this workshop will be provision of a model and resources that

can be translated to other STEM disciplines and any class size

## **Detailed description**

Implementation of group work in large classes (>500) presents challenges around task design, implementation, management and assessment. Computer-mediation enables group formation and function: student investment in both the process and outcomes of the task is promoted by allowing them to choose their preferred scenario topic and by providing the option for them to self-select into/or from their preferred groups. Interdependency within groups of four is generated by requiring each student to complete separate individual research quests to generate information files required by the whole group for the collective product. Individual quests have been constructed so that the collective outcome would be of lower quality if one of the four sets of information was missing. Once the collective product is submitted, the iCAS task management and assessment system directs students through two separate peer assessment domains: evaluation of the contributions of their own team members; and individual assessment of other group's products within the same scenario promoting reflective processes. This workshop is structured to enable participants to explore and assemble the components of the task and gain insights into the factors that influence the learning processes and products. The sequence of workshop is proposed to be:

### **Introduction: engagement and orientation into workshop**

#### **Activity 1: Interdependency & Communication**

- Participants will be engaged in an activity that generates evidence and demonstrates the role of interdependency in collaborative tasks.
- Facilitators will share common misconceptions of how students work collaboratively outside the classroom. Strategies for promoting interdependency in activities that progress outside the classroom will be presented.
- Discussion question: What are the inherent challenges in engaging students in formative assessment?

#### **Activity 2: Interdisciplinary Thinking & Creativity**

- This activity helps participants explore how individuals bring prior experiences and perspectives that combine to generate shared understanding and an interdisciplinary product. This activity is set in the context of 'Infinity'.
- Facilitators will introduce participants to assessment of the collective products of group tasks in terms of integrated ideas and higher order thinking (including exemplars of a range of student products).
- Discussion question: What options are available for assessing collective products of inquiry-based group work?

#### **Activity 3: Web-Based Management of Collaborative Group Work**

- Participants will be introduced to the characteristics of a successful collaborative student group through case studies and how to use related indicators to monitor group function.
- This brief activity includes a hands-on practical challenge that will engage participants in teamwork themselves.
- Participants will be introduced to the online peer assessment management tool that promote students' reflections on their own participation and develop their skills in professionally reviewing peer products.
- Discussion question: How can collaborative group work be sustained and evidence of individual outcomes within a group logged?

## **Conclusion**

Brief reflection on the session, feedback and evaluation. Distribution of resources to participants including Interdisciplinary Scenario Inquiry Task Resource Handbook developed as part of the 2009 ALTC project 'IS-IT learning? Online interdisciplinary scenario-inquiry tasks for active learning in large, first year STEM courses' (CG9-1112).