For developing a framework to achieve student interaction and a strong student community that lays a foundation for 'soft skills' and motivates students to learn.

OVERVIEW: SUMMARY OF CONTRIBUTION AND CONTEXT

This nomination outlines and provides evidence of my success over the last five years in working on improving student learning and addressing the national skills shortage in Information Communication Technology (ICT) through a range of engagement and transition strategies. Australian Computer Society figures show that since 2003, the number of jobs in ICT has grown by 31%. However, there is currently a national ICT skills shortage with the number of domestic ICT students halved in this time[1]. Importantly, to be 'work-force ready' directly from university, interpersonal and communication skills, referred to as 'soft skills' in the ICT discipline, are a desired trait of graduates. I have addressed two significant challenges that face lecturers in ICT: invoking and maintaining student engagement to ensure comprehension and positive learning outcomes; and the progressive development of 'soft skills' throughout the degree. I have been evolving methods to address these challenges since 2008 and these methods are demonstrated via three subjects: 'Database', 'Multimedia' (both first year subjects with class sizes from 80 to 100) and 'Networking' (a second year subject with class sizes of 40).

The first challenge was to improve engagement, interaction and interest in my classes. The traditional didactic approach is not effective - teaching by telling does not work. My goal was to maintain the intimate atmosphere common to the tutorial environment in larger lecture classes to support and invoke interaction and discussion. I believe active learning methods, in conjunction with a traditional didactic approach, can better engage students and allow me to measure comprehension during the lecture. I have implemented a lecture/tutorial hybrid to overcome the 'glassy-eyed nod' as passive students phase-out of the information flow during lectures. I saw the potential of the hybrid for combining the tutorial-style learning environment with the traditional lecture. Students interact with me as a facilitator of learning rather than as a source of information.

The second challenge was to develop 'soft skills' in an ICT degree when such qualities are often overlooked within the curriculum design where 'hard skills' or technical expertise are considered paramount to successful transition to the workforce. The development of communication methods and exposure to professional team related skills are imperative to the production of quality ICT graduates. I have addressed this challenge by interweaving community and partnership development and transition techniques into the curriculum to nurture 'soft skills' over the course of a student's degree[2]. Beginning with a focus on first year transition, my techniques include structured group work to initiate interpersonal skills development. To further develop these skills I initiate extra-curricular activities that involve teamwork and interaction between all year levels. These activities develop a close student community that results in an exceptional overall university experience.

My approach to addressing the two challenges outlined above has been recognised through scholarly contributions, external teaching and learning funding, citations and national and international consultations.

CRITERION 1: APPROACHES TO LEARNING AND TEACHING THAT INFLUENCE, MOTIVATE AND INSPIRE STUDENTS TO LEARN

To address the first challenge, my teaching has evolved over the past five years using active learning and structured group methods, combining the beneficial aspects of lecture environments and tutorial group work – creating a hybrid - to motivate students to learn. Authentic learning and partnership development takes place in interactive environments where students gain knowledge through collaborative work and teachers can assess comprehension to guide teaching strategies. I create an interactive environment in both my tutorials and lectures. Role-playing group methods are utilised in tutorials to maximise student engagement and interest and, three years ago, I introduced *Process-Oriented Guided Inquiry Learning* (POGIL) to my lectures. POGIL is a pedagogical method designed for use with highly structured *self-managed* teams and therefore encourages an interactive environment[3].

I adopt a student-centred strategy in my use of POGIL, where students work in small groups with structured individual roles to stimulate curiosity, discussion and independence in learning that ensures all students are fully engaged in the learning process. This method entails building a culture of group work and community spirit in lectures; the process begins in the first week of the degree. I introduce group work to the students using a fun interactive exercise that demonstrates effectively the benefits of learning with a collective

knowledge instead of as individuals. The students complete a task as individuals and then as groups. Focus is given to the feelings of confidence during the task as, generally, confidence is higher when working in groups. Students work together in groups of three with assigned roles of 'Manager', 'Recorder' or 'Presenter'. Importantly, each role is dependent on the others so students are accountable to their peers. I change the group members and roles for each lecture to avert stagnation and cater to irregular student attendance.

I interweave group tasks into the lectures for a number of reasons: after the introduction of key concepts to gauge comprehension or extend thinking; to coincide with waning attention spans; and to combine theory and practice effectively. By doing this, I expose the gaps in knowledge to the students, who are then more receptive when concepts are explained further because they are conscious of this deficit. The typical 'nod' from students during lectures does not denote comprehension – I have found a distinct 'disconnect' between what would appear to be an understanding in class and corresponding test results. The POGIL activities I create encourage a deep understanding of core concepts through an exploration to construct understanding while developing higher-order thinking skills. The group's 'Presenters' communicate their conceded answers in oral form to the whole class. If a majority of groups struggle with a task, I can dynamically alter the lecture to spend more time on that subject or concept. That is, I am provided with necessary feedback on student learning and comprehension, during a lecture, to diversely adjust content delivery 'on the fly' depending on the students' understanding of concepts.

To address the second challenge, I work with the premise that students who are part of an interactive community are more likely to be successful. My introduction of specialised group work in 1st and 2nd year level develops process skills and 'soft skills' (i.e., critical thinking, problem solving, self-confidence, expert articulation and communication capabilities) to prepare students to be more competitive in a global market. My classes evolve quite rapidly into a community, as opposed to isolated individuals or cliques, because I change the group membership and the roles within regularly (with each class). This takes students out of their comfort zone as a whole, which results in a collective common experience they all share with each other. This evolution evokes open discussions, laughter and a comradely culture from an early stage of the semester between all students and myself, and is essential for the transition from student to workforce member. Students who would normally remain isolated and not participate in class activities feel comfortable early in their 1st year to engage with others, including myself as facilitator. I strategically create groups based on knowledge of students' personalities, level of understanding and the lesson plan to foster peer mentorship. The peer accountability assures no student is left behind because group members must ensure all members understand concepts equally. My strategy benefits students by the progressive increased confidence in their abilities as they successfully achieve tasks as a collective in a fun and open atmosphere that goes beyond the classroom.

To foster a student learning community, I have extended the university's student mentor program via a funded facility to empower the 2nd and 3rd year students with greater community responsibilities, such as forming greater connections with 'at-risk' 1st year students. To further invoke a feeling of community among all year levels across university campuses, I also initiated an IT@JCU Facebook group. Students from all year levels are encouraged to join and take ownership, with the purpose to bring our ICT students together in a familiar environment. This virtual community gained instant popularity and its sustained activity positively affects the student experience.

To address workforce transition and exposure to professional team-related skills, I have created a team-based internship program. I believe the transition from student to workforce member begins from the 1st year of the degree, however, Work Integrated Learning initiatives are traditionally reserved as capstone subjects in 3rd year. To fill this gap, I have initiated 1st and 2nd year internships with local business over the past three years where students work together on real-world projects for local industry between semesters. These internships are team-based and build on the group work concepts the students have developed in class with POGIL. Students who take part enter their next year studies with a maturity of knowing the areas of content knowledge and 'soft skills' that still require development. They are more receptive to the content because the material now has real-world context:

*"The greatest thing I gained from my 4 weeks at AIMS was an understanding of how little I know. Applying the concepts I have learned in the past year in a real work environment clarified and emphasised the importance of what our lecturers teach us. I had several "light bulb" moments where concepts I had learned and applied to satisfy a marking criteria became **real** and I understood their importance...I know what areas I need to focus my studies on" (1st year student feedback, AIMS internship 2012).*

"The students surpassed all expectations...They listened to advice and worked independently with minimal input from AIMS staff" (Mark Rehbein 2012, Manager, AIMS Data Centre).

CONTRIBUTION TO STUDENT ENGAGEMENT, LEARNING AND/OR OVERALL STUDENT EXPERIENCE

Student evaluations of subject (Figure 1) and teaching (Table 1) show quantitative results over time, which evidence continual improvement over the past five years as my methods evolved based on student feedback.

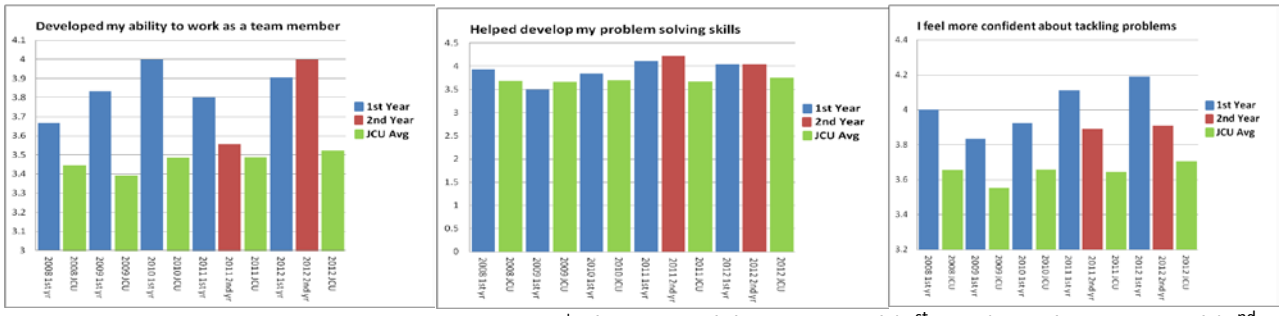

Figure 1: 2008-2012 Student evaluation ratings[+] - 'Database', 'Multimedia' (1st year) and 'Networking' (2nd year).
[+] The response rates in all listed subjects were almost double the average University response rates.

Table 1: 2009-2012 Student evaluation ratings - 'Database' (1st year) and 'Networking' (2nd year).

Relevant Student evaluation questions	**2009**		**2010**		**2011**			**2012**		
	1st Yr	JCU avg	1st Yr	JCU avg	1st Yr	2nd Yr	JCU avg	1st Yr	2nd Yr	JCU avg
This teacher communicates clearly	4.2	3.0	4.23	3.17	4.26	4.1	4.1	4.41	4.8	4.19
Encourages active participation	4.4	3.5	4.53	3.0	4.74	4.5	4.0	4.75	4.73	4.14
This teacher is an effective teacher	4.4	3.75	4.4	3.2	4.52	4.4	4.2	4.43	4.73	4.28

As I teach both 1st and 2nd year subjects, students are exposed to POGIL over both years. My students have intimated they feel the structured groups made a distinct difference to their understanding of the subject matter and ultimately their final grades. Quantitative results from a POGIL-specific midterm survey (Figure 2) indicate a positive consensus with over 80% of students concurring POGIL is conducive to the learning experience[4]. Relevant qualitative comments from the students' perspective (Table 2) show distinctly similar trends on their feelings of engagement and learning outcomes.

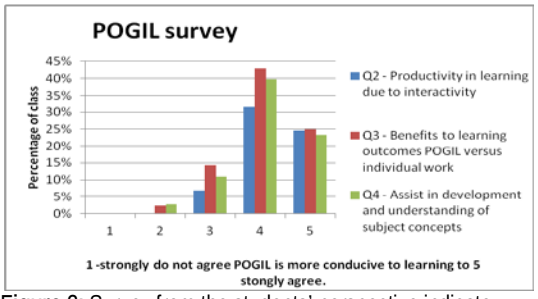

Figure 2: Survey from the students' perspective indicate POGIL to be beneficial to study (*n*=168) (Myers, et al., 2012).

Importantly, the teamwork sessions had a positive impact on student-learning outcomes - exam and test results showed improvement in capabilities. Those that attended the lectures and tutorials and took part in POGIL correctly answered the assessment components for those concepts. The scores were distinctly lower for all those that did not take part in the group work.

Table 2: Sustained student impact - Students' perspective on engagement and progression as seen from 2009.

Trends	**Examples of Students' Comments**
Student engagement	Trina's teaching methods and flexibility allows me to learn in a more socially constructive way which suits my learning style. Group learning works so well (Student evaluation, 2010). Shared Knowledge! Different perspectives! (Student evaluation, 2011). I don't zone out for the entire class. You get different opinions and ideas, if you're not really getting it someone in your group does. Get to meet everyone (Class survey, 2011).

	It encourages teamwork among antisocial ICT students (Class survey, 2012). POGIL - It did a great job! The moments you got stuck there was someone to help you out, just like in a real working environment (Student evaluation, 2012).
The development of interpersonal skills	We do the work ourselves, not just listen – Meet/work with people (Student evaluation, 2009). Meet interesting people, sharing ideas to discuss and solve problems together, allows to know everyone each time in new group. Positive class environment (Student evaluation, 2011). Working outside of my normal group of friends is good. I like to learn how to think differently about the concepts in class (Class survey, 2012).
Team related 'soft skills' through peer accountability	Being forced to be productive; Exposure to other members' talents (Class survey, 2010). Get feedback from team members 'bounce ideas off each other' (Student evaluation, 2010). Collaboratively use our knowledge to form a reasonable response (Class survey, 2011). It encourages each member to contribute to each other's learning (Class survey, 2012).
Group work benefits learning outcomes in lectures.	Truly find out what you know by getting feedback from others (Student evaluation, 2009). The interaction between students aids us to gauge where we are at (Class survey, 2010). Break from spoken material - reinforcing topics (Student evaluation, 2010). Easier to learn the material. Good way to pick up different ideas (Student evaluation, 2011). POGIL makes the lectures interesting and lecturer understandable (Student evaluation, 2012).

Peer Reviews of Teaching (2011 and 2012) resulted in significant interest from many disciplines:

"POGIL inspired students to act collaboratively...Students were highly engaged with the tasks and with the reviewee, and displayed high levels of motivation…importantly they seemed to have fun without detracting from the overall lecture...a very positive contribution to ICT…they foster a wider set of life skills than simply the immediate subject material" (Reviewers comments from Veterinary Science and Business, 2011/2012).

My innovative lecture/tutorial hybrid has resulted in significant recognition, including a *JCU Faculty Citation for Outstanding Contributions to Student Learning* (2012), positive student and peer feedback, an *Australian Deans of ICT Teaching and Learning grant* (2013) in collaboration with Griffith University. My use of POGIL is the first documented trial in the ICT discipline and my experiences and adaptation of it has been published (Myers et al. 2012). The journal editor indicated the keen interest in this method in the wider community below:

"We have to hurry your revisions. It's unusual to read a POGIL paper outside Chemistry or Biology" (email — Margaret Lloyd, Editor, Journal of Learning Design).

CONCLUSION

My solutions to both challenges have proven to be an innovative and constructive way to increase student engagement and comprehension during lectures and develop course-wide community involvement, which lays the foundation for the transition from student to the workforce. The peer-driven environment I have created cultivates interpersonal and oratory skills, critical thinking and analytical skills – 'soft skills' vital to addressing the national ICT skills shortage and are parallel with JCU's strategic intent to help develop the core graduate attributes. My techniques have been recognised internally, nationally and internationally. After receiving an unsolicited letter of commendation from an ICT student, the Vice Chancellor sent a personal email in recognition of my activities in building a cohesive student learning community:

"I want to warmly congratulate you on the effort you are making for and with your students. It is not usual that a student would feel strongly enough to bring their experience of teaching and student engagement to my attention. You clearly have/are making a big difference to your students. Thank you for that…your efforts are very much appreciated by them – and by me" (Professor Sandra Harding, VC, JCU, 2013).

1. Uhlmann, C. (2013). *Do skilled migration numbers match political rhetoric?* Australia: 7.30 Report, ABC News. **2.** Kift, S. (2009). *Articulating a transition pedagogy to scaffold and to enhance the first year student learning experience in Australian higher education. Final report for ALTC senior fellowship program.* NSW: ALTC. **3.** Moog, R. S. & Spencer, J. N. (Eds). (2008). *Process Orientated Guided Inquiry Learning (POGIL).* New York, NY: Oxford University Press. **4.** Myers, T., Monypenny, R. and Trevathan, J. (2012). Overcoming the glassy-eyed nod: An application of process-orientated guided inquiry learning techniques in IT. *Journal of Learning Design, 5*(1), 12-22.