

For sustained commitment and enthusiasm to improving student engagement and achievement in marine biology through multi-dimensional teaching and response to feedback

Context and contribution:

"It was always a pleasure attending class because you knew so much about each organism and you seemed so interested that it made me interested. You had the most helpful teaching style I have ever received. This was a hard subject that expected a lot out of me, but I learned more in marine invertebrates than I did in any other subject. The information I learned has opened my eyes to new world of creatures and I have a better understanding of what I am seeing because of you. Thank you for all your help and your enthusiasm for marine invertebrates." (Anonymous Thank you letter from Invertebrate Biology 2008).

With a teaching program underpinned by student and peer comments collected over time, and incorporating lessons learned from them, as well as from models of exemplary teaching within the field, I have been able to create a teaching program with a continuous spiral of improvement. What began to stand out in observing exemplary mentor teachers as a higher education student and communicating with students while acting as a tutor in marine biology subjects, was that active learning supported by a multi-sensory, multi-styled program, presented with genuine enthusiasm for the field, inspired greater student understanding and encouraged their respect and commitment to the high standards of scientific thinking. It has been my experience that the principle teaching strategies that engage learners and insure greater competency as well as motivation include:

- Demonstration of enthusiasm for subject content and for learning, itself.
- Development of an active and accessible communication style with students.
- Creation of a multi-sensory, multi-style approach to teaching to reach the diversity of the students.
- Innovative assessment that allows students to apply knowledge to discipline-specific employability skills.
- Consistently productive and supportive feedback.
- Openness and receptivity to student and peer feedback.

Using the strategies above, my teaching has been highly successful as evidenced by both formal and informal peer and student feedback, since 2005. Through my teaching I have found that a program that incorporates these strategies is best created in response and receptivity to student feedback, insuring that my teaching strategies are relevant to their needs, supportive of their greater achievement and, deepening of their commitment to high standards.

Recognizing the importance of student feedback in this regard was a professional lesson I learned at JCU, while tutoring in marine biology subjects from 2001 to 2004, during which time I was able to establish close communications with students and I became acutely aware of their educational needs and concerns. They had questions of relevance regarding the curriculum, felt that the practicals were not linked to the lectures, that the assessment did little to prepare them for postgraduate programs and/or the workplace, that they did not get appropriate feedback so that they might make improvements and that there was little regard for these concerns. I inherited the class mid semester in 2005, with the vantage point of understanding and respecting the students' needs, and having an established rapport for communication to further that process. Having access to student feedback helped me shape strategic teaching that benefited the students tremendously. For example: a comparison of SFS (*Student Feedback on Subjects*) results between 2004 and 2006 on a scale from 1-5 show that overall satisfaction in the quality of student learning experience, interest level generated by the subject, quality of information provided about assessment requirements, quality of comments on assessed work and staff interest in assisting students to learn increased on average by 21.6% approaching scale level 5 (outstanding). I had such success accepting and building upon student feedback that I continued to do so and it has become one of my main tools for curriculum re-design, enhancing my teaching and achieving better outcomes in student learning.

Criterion I: Approaches to the support of learning and teaching that influence, motivate and inspire students to learn:

The teaching strategies which I have developed reflect the principles for which I have received recognition from my peers and my students: enthusiasm, accessibility, attention to diversity and multi-approach activities, innovative assessment, conscientious feedback and the continued interaction and communication with my students. In so doing I have been able to meet students' needs, raise their enthusiasm and improve their achievement.

Enthusiasm for marine biology and for learning itself:

"Lindsay knows more than anyone how to motivate the students. She is so enthusiastic that you cannot remain uninterested, and you finally aim at doing your best." (SFT Marine Invertebrates of Commercial Importance 2007).

Many students frequently comment on my high energy and enthusiasm for subject content and their learning. I believe that my enthusiasm will be contagious and encourage the students to be equally motivated and inspired. *"Her excitement and enthusiasm about the invertebrates and the subject motivated me to give it my best. I ended up being on top of the class, which would have been impossible without her."* (Marine Invertebrate Biology 2007). To deepen engagement, I place subject matter in the context of day-to-day life. Bringing the fields of science into the foreground of life's daily occurrences is a way to generate interest in subject matter, assist in the students' absorption and retention of knowledge, foster intrinsic motivation and stimulate passion to learn. *"You put the subject content into perspective. Still very challenging subject, but I learned so much and was always interested. I feel like when I go back to the States I will be more prepared for my classes."* (SFT Molluscan Biology 2006). To further promote student motivation and learning, I model high interest in and dedication to continuous learning about both the subject content and my teaching. This ranges from sharing new discoveries in recent publications, to the enthusiasm I show to students who share their own learning materials and/or specimens with me. *"Always excited when students bring in new discoveries, which promotes the motivation for even more discoveries! She was always looking to learn herself (taking notes during guest lectures), encouraging lifelong learning."* (Former student in Molluscan Biology 2006).

Active and accessible communication style with students:

"Most helpful and in-tuned to students' needs of any teacher I have ever had." (SFT Invertebrate Biology 2009).

In an effort to support student learning, I establish a good rapport with each student. I pay attention to their individual progress and make it clear that I am interested in their welfare I believe that a good teacher is able to recognize when students require assistance and promptly and appropriately respond. *"She is very keen to learn how we are coping throughout semester and always eager to help in any way possible."* (SFT Marine Invertebrates of Commercial Importance 2007). *"Always smiling and enthusiastic - your attitude toward your students was always welcoming, understanding and positive; you would listen, not just hear and you always seemed genuine in wanting to get to know your students. There was never any communication barriers, nor discrimination, you treated everyone with respect and valued everyone's differences and their experiences that made them who they are."* (Former student in Molluscan Biology 2006).

Each subject I teach at JCU is a miniature community. I have come to understand that it is essential that my teaching takes full advantage of and respects the diversity found there. I constantly strive to maintain an awareness of the socio-economic, cultural, age and gender profiles of the student demographic, as well as of their varied learning styles. I am aware that those re-entering the education system may have special needs. Similarly, those with other jobs or an inordinate school load, those maintaining a family, those far from home and those with inadequate preparation from previous learning experiences may also require tailored assistance. I maintain an open door policy, making myself available to students to assist them in establishing and balancing their studies and reviewing difficult materials in order to achieve the quality of education that they hope for. It is my belief that when students feel as if they are valued as individuals and that I genuinely care for their learning, they feel inspired and motivated to learn. I was presented with an Inclusive Practice Award in 2007 by AccessAbility Services for providing outstanding support to student/s with a disability recognizing my efforts to be flexible, consultative, proactive and innovative in minimizing challenges for students studying with a disability. This award reminded me that it is imperative that I continue to maintain my own education about the diversity of my student demographic.

Multi-sensory, multi-style approach to teaching to reach the diversity of the students:

"Her practicals in marine biology, that I have seen, are of the highest standard, packed with interesting material with as many live specimens as possible. The factual information and interpretation sheets lead students through the visual-fest clearly and do not leave the students overwhelmed. They are interesting and students stay to the very end of the time period. They are happy students, and the practicals always have the quiet burble of actively engaged students." (Peer review: retired Senior Lecturer).

I have come to understand the role I need to play in inspiring my students to engage with scientific thinking whatever their background. I select materials and activities to stimulate inquiry, observation, learning and reflection. I place high importance on creating and maintaining novel learning environments. My lecture style combines high levels of animation to motivate and engage students. I use minimal text in my heavily illustrated presentations, to encourage active note taking, resulting in enhanced retention and understanding of the subject matter. In addition, I utilize many other teaching mediums: film clips, live and preserved specimens, drawings and props. (i.e. To illustrate the function of the hydrostatic skeleton I use water balloons and to demonstrate the role of the tube feet in the water vascular system of an echinoderm I use a turkey baster). I am constantly aware that my classroom is comprised of students with diverse learning styles that require a range of teaching techniques and strategies to ensure absorption of materials. *"I really appreciated the way Lindsay tried to make the class an environment conducive to learning. I could not have taken in all the information any other way."* (SFT Invertebrate Biology 2009). *"The use of videos throughout lectures and practicals really helped my learning."* (SFS Marine Invertebrate Biology 2006).

During my practicals, instead of having limited options and set outcomes, students are encouraged to learn on their own terms, and study specimens they want to examine, adding depth to the subject and facilitating application of knowledge. The model of active learning that I utilize requires students to take responsibility for their own learning. It is a model that fosters a cooperative rather than competitive learning environment. It also stimulates and nurtures intellectual curiosity in students. *"Lindsay changes the (normally quite clinical and formal) practical environment with the use of videos, extra reading and a huge array of posters, photos, printouts, slides and specimens, both live and preserved. The prac rooms are transformed into a colourful and stimulating environment where students are encouraged to interact with the materials, all of which piques students' interest and encourages curiosity." (Peer review: Tutor). "A very different practical style than I have ever seen before. It forced the student to take initiative about his/her own learning instead of being told what to learn. The subject forced me to mature as an academic student." (SFT Marine Invertebrate Biology 2006).*

Innovative assessment that allows students' to apply knowledge to discipline-specific employability skills:

"I have always enjoyed planning assessment pieces with Lindsay, her approach to assessment is refreshingly innovative and not constrained by traditional methods." (Peer review: Lecturer).

I use a variety of assessment strategies, providing students with opportunities to authentically demonstrate comprehension, organization and conscientiousness. I explicitly incorporate generic and discipline employability skills within the subject curricula as it is vital that time is spent not only with learning subject content, but also learning the formal methods to acquire, reflect upon, understand, and evaluate this information, and the great bodies of information to come. Practical and associated assessment are designed such that students gain experience in scientific writing, communication and biological illustration in the context of the study of marine invertebrates. Other skills that I promote are specimen collection, taxonomic identification and laboratory techniques. I believe that these are among the fundamental skills related to the employability of any student of biology. *"Assignments are designed to avoid rote learning of the material as much as possible, and instead focus on a deeper understanding of biological concepts. Other assignments go even further, and teach students the fundamental skills that will help them move from study to becoming professional biologists. These include writing literature reviews, critiquing journal articles and giving oral presentations." (Peer review: Tutor). "The variety of assessment methods used in Marine Invertebrate Biology tested a large range of skills and also allowed freedom for personal exploration of the topic. Dr. Harrington designed assessment methods that would not only develop and test academic skills but also foster skills that would prove to be useful on a more practical level. I still refer to the practical notebook produced for assessment of the practical sessions. This workbook contained the directed learning objectives from the practical sessions, but also provided an opportunity to expand these topics and to explore areas of personal interest. The assignment to write the fieldwork results as a manuscript for a journal submission rather than in normal scientific report format was a very useful lesson, one that I was glad of when writing my first paper. The variety of assessment methods kept the work stimulating and interesting, but also gave opportunities for every student to find an area they could excel in." (Former student in Marine Invertebrate Biology 2006).*

Consistent, productive, supportive feedback to the student to guide and enhance learning:

"Amazing teacher so much concern for her students and subject. Couldn't have given more effort to give us feedback, evaluation and information of what is expected. All tasks contributed to my learning and were very balanced with opportunity for exploration of interest." (SFT Molluscan Biology 2006).

Over time increased constructive, supportive and encouraging feedback identifying the areas of excellence in a student's work whilst also describing how the student could make improvements. I always show students examples of work that received higher marks as a learning tool. In addition to giving them my personal feedback, I encourage and facilitate self and/or peer evaluations. *"Lindsay has designed and paced her assignments so that students always get marked assignments back before the next assignment in due. This helps students learn from their mistakes, and often if there are common errors from the class. Lindsay will take time in lecture or prac to cover these errors and help students avoid making the same mistake twice." (Peer review: Tutor). "She assessed us as individuals, often pointing out the things we did well." "Her comments on assessments are really helpful and her constructive criticism is delivered in a way that does not dishearten the student.... I really think my learning has benefited by taking this class." (SFT Molluscan Biology 2006).*

Openness and receptivity to student and peer feedback:

I make it a feature of my work to encourage and solicit student and peer feedback through multiple measures of evaluation. I spend substantial time reviewing the results to seek out ways in which I can make continuous improvements to enhance the level of learning, interest and enjoyment in the subjects I teach. This is reflected in the increased levels of student satisfaction with my teaching from 2006 to 2009 (Table 1) and increased levels of student satisfaction in the subjects I teach (as previously stated). I explain changes I have made to students as a result of student feedback, demonstrating that I have a high regard for their concerns and learning. Students have been my greatest teaching mentors. As reflected above, their learning is my mirror.

Evidence of my sustained contribution to student learning, and engagement:

My commitment to ongoing evaluation, and my willingness to learn techniques to improve the quality of my teaching are well documented. My scores for all core questions on the SFT *Student Feedback on Teaching* have been significantly above the university mean clearly demonstrating that I have sustained a high level of teaching and learning excellence. This has continually improved over the years I have been interacting and learning from students and other exceptional teachers at JCU (Table 1). In addition, I have had consistently high level scores on the JCU measures of subject effectiveness (SFS *Student Feedback on Subjects*) for both first time subject offerings and subjects I inherited that previously received lower scores.

Table 1: Percent of students rating my teaching "Outstanding" on a selection of Student Feedback on Teaching (SFT) core questions in 2006, 2007 and 2009 relevant to this application. My coordination of a subject is noted by *.

	Molluscan Biology* 2006	Marine Invertebrate Biology* 2006	Marine Invertebrate Biology Masters* 2006	Marine Invertebrates of Commercial Importance* 2007	Invertebrate Biology 2009	Increase in proportion of students responding "Outstanding" from 2006 to 2009
Total number of student responses	34	62	6	58	97	
This teacher's interest in assisting students to learn was	93.1%	90.3%	100%	85.3%	95.9%	2.8%
The level of feedback provided by this teacher was	77.6%	79%	100%	76.5%	89.7%	12.1%
This teacher's efforts to motivate students was	77.6%	80.6%	100%	85.3%	92.8%	15.2%
The level of interest generated by this teacher was	77.6%	61.3%	83.3%	66.7%	86.6%	9%
This teacher's availability to students was	81%	85.5%	100%	81.8%	87.5%	6.5%

Recognition:

My teaching is rated as outstanding by my peers at JCU: *Head of School: "Lindsay is an outstanding member of the teaching staff...the quality of her teaching is exceptional and this is emphasized by the rave reviews of her students...letters of commendation from the Pro-Vice-Chancellor for excellent SFS outcomes. The effectiveness of her teaching was further emphasized based on student performance in exams."*

Lecturer and School Academic Advisor: "Her enthusiasm for the subjects that she teaches in is contagious and fosters an exceptional learning environment. Her innovative teaching techniques successfully engage a diverse student population...Lindsay is an invaluable asset to the entire learning community at JCU. Her commitment to the development of students from diverse backgrounds is unsurpassed amongst the academics in our School."

Retired Senior Lecturer and former subject coordinator of two of my subject. "Lindsay has an excellent relationship with current and past students. This excellent relationship with the students has arisen from a variety of sources: she knows her subject matter, she can communicate her knowledge in a way that maintains their interest, she has quickly learnt from student feedback, she has taken notice of parts of past practicals that did not work well, and corrected this in later practicals, she makes her self permanently available to her students and she is genuinely interested in the students as individuals. She is a naturally gifted teacher."

I receive regular unsolicited positive correspondence from graduate and undergraduate domestic and international students informing me of exciting discoveries they have made in their learning, volunteer work and careers, thanking me and linking their positive life experiences to my teaching quality and curricula design. I am extremely encouraged by their responses, for example:

"Dr. Harrington was not only an excellent teacher in her subject but also became my mentor during my time at JCU and advised and guided me whilst I was exploring options to continue in my career in marine biology. I am extremely grateful for the advice and support I was given and if it was not for Dr. Harrington's encouragement and belief in my abilities I may not have carried on down the research path that I am very happily and successfully following at present." (Former student in Marine Invertebrate Biology 2006).

I am invited regularly to conduct peer reviews of colleagues. Also I was recently recruited to carry out a Faculty-funded project on Generic Skills and developing Study Aboard Packages. *Head of School: "Her leadership in this project will connect her excellence in teaching across Faculty boundaries."*