

Experiences from Teaching in A Novel Style to Freshman Chinese Students – International Higher Education in Practice

Erik Hemberg
ALFA, MIT CSAIL

Ying Lin
STU

Anthony Fung
STU

Una-May O'Reilly
ALFA, MIT CSAIL

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Abstract

National education systems are constantly looking for ways to improve their students' acquisition of knowledge. They sometimes turn teaching methods that are not in practice at home but which appear effective elsewhere. This paper presents an anecdotal experience which focused upon teaching students in a manner that was culturally new to them, in an effort to increase their class participation and engagement with the subject. This strategy was directed as a means of achieving better learning outcomes in terms of the students' achieving a deeper understanding of the material and moving away from rote knowledge. The contribution focuses on describing the teaching "innovations" and how they were received.

The two instructors, O'Reilly and Hemberg are faculty and staff, respectively of MIT's School of Engineering. We both have moderate experience lecturing and giving tutorials in our domain of expertise. We self-identify as typical college faculty who are not specialists in education¹. Through an educational relationship with Shantou University, China and the Li Ka-Shing Foundation, we had the opportunity to teach in China in Spring 2013. Ying Lin and Anthony Fung.

¹We preemptively apologize for the crude presentation from lack of formal education science training.

supported us and contributed to the project by providing guidance on teaching to the students and describing what style of teaching was being sought.

The course setting was an intensive, week long course module with a small class of English-fluent Chinese freshman and sophomore students. The 22 students were individually selected according to their fluency in English, programming and a willingness to learn in new ways. The students had mostly different engineering and science majors. Half of the class described themselves as beginners in programming and others as advanced. The module was on *evolutionary processes*. The teaching goal was for students to gain an abstracted view of evolution so that they could naturally recognize it in action, in domains other than biology. We connected the abstraction to computation and intelligent behavior to teach students how evolution can be an inspiration for Computer Science and Artificial Intelligence.

Chinese students are often taught in large classrooms with limited opportunity to ask questions. Students have strong technical skills and work impressive hours. However, strong emphasis on knowledge itself and test performance, rather than knowledge acquisition and application, may result in rote learning and does not foster initiative, invention and problems solving ability. We received guidance that it was as important to expose students to new ways of learning as it was to teach them the course material. As a result we decided to teach in a highly interactive manner. We used CDIO [2] and deep learning [3] to inform our lecture design. We:

- made students aware that there are different ways to learn and to become conscious of these opportunities
- introduced students to self-assessment and reflecting on what they have learned.
- proposed students to consider themselves life-long learners, both inside and outside the classroom.

Our goals included encouraging students to:

- learn because of curiosity. We invited questions and promoted being **bold** and being willing to make mistakes while learning from them.
- explore concepts in a hands-on way via *a)* role playing *b)* “think-pair-share” *c)* “Active Learning” [1] and through programming, verbalizing, and writing.

We collected evaluation information by an anonymous end of course survey and from ungraded diaries that students wrote during the course.

All 22 students answered the question “Would you recommend this course to a friend?”. There were 22 responses, 21 (95%) were yes and 1 (5%) was a qualified yes due to a misunderstanding of the course syllabus. We classified free text comments: 32% appreciated the learning style and that it expanded their understanding of evolution and taking it as a world view, 5% said no cramming, 23% said enjoyable, 18% found it too short. The improvements suggested better time schedule, more programming, state course goals earlier and provide more material.

In our estimation, the students liked the new learning styles and they embraced “how to learn” and “what to learn”. We need to encourage students to ask questions when they do not understand. Self-organization needs to be encouraged more as well.

Because english was the students second language communication was the limiting factor, not content comprehension. Thus, we presented the content more slowly and at a more rudimentary level than to a typical college class of native English speakers.

We described new methods and new material of the fantastic experience of teach 1st year engineering students at Shantou University.

References

- [1] C. C. Bonwell and J. A. Eison. *Active learning: Creating excitement in the classroom*. School of Education and Human Development, George Washington University Washington, DC, 1991.
- [2] E. F. Crawley. *Rethinking engineering education: the CDIO approach*, volume 133. Springer Science+ Business Media, LLC, 2007.
- [3] J. Tagg. *The Learning Paradigm College*. ERIC, 2003.