Internationalizing Teaching Practices in The Engineering Curriculum

Fabio Campi,
School of Engineering Science

Simon Fraser University
Problem Statement

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- Given social and economic rise of Pacific Rim countries, this second map possibly captures global dynamics more accurately.
British Columbia represents a bridge between “Westernized” society and emerging economies.

Many emerging nations see BC schools as an opportunity to strengthen the education of their best students, easing social and economic interaction with the western world.

This requires Internationalization of current Curricula (Stromquist, 2007).
• 4,257 undergraduate international students (IS) registered at SFU in 2014
  • 16.9% of the undergraduate population
• 1,233 graduate international students (IS) registered at SFU in 2014
  • 28.3% of the total graduate population.

• 19% of undergraduates are entering SFU from schools outside Canada. 98% of them, come from language and cultures very different from that of Canada.

http://www.sfu.ca/irp/news/international_student_report.html
Why Students (and IS between them) choose University?

99% of students in a 2010 Academic survey of over 200,000 students in Canada chose either “career preparation” or “career advancement” as a key reason for post-secondary education.

Motivation for Post-Secondary Studies at UNSW, Sydney, Australia (Krishnan, 2008)
Motivation

- For most of our international students (IS), motivations for flying thousands of miles away from home and sitting in our university classrooms are NOT

Satisfy their intellectual curiosity
Experience a different culture
Engage or spark their passion

Student seek mostly material accomplishment, increase of social status, acquisition of competitive professional skills for themselves or their society
International students, their families, *sometimes even their nations* are heavily investing in them. And they all expect a return on the investment.

- This amounts to an enormous self-pressure.
- This can be a strong factor to stay in school in the long term, but as 20 years old kid sit in class after lunch in a sunny afternoon, a good position in 3 years time is no immediate motivation to focus on the learning.
A great danger for IS is to slip into «Tick-boxing»

- A BEEN-THERE-DONE-THAT attitude towards learning activities: As long as I sit in your class and swallow knowledge that I can regurgitate at exams, that will add up to my resume and get me one step closer to a good job
- A class is equivalent to a visit to a dentist: painful, but necessary
Thick-boxing resonates with the obvious “Linus Security Blanket” for all immigrants in any country of the world: ISOLATE THEMSELVES with people of same heritage, and live a parallel life in Canada “rejecting” any contact with Canadian society and way of life.

Many IS unconsciously opt for a “No Contact, No Interaction” strategy towards instructors and peers.
• International students tend to be very focused and determined in the long term

BUT

• They are at times determined to use university without living it: they are prepared to insert time and money, and they expect the machine will produce the necessary skills for their resume that they can eventually carry home.

**WHAT ARE THE MOST EFFECTIVE WAYS FOR AN INSTITUTION TO REACH OUT TO ITS INTERNATIONALS?**
Role of Faculty Members

• In order to guarantee a positive experience to international students, the role of teaching faculty is (arguably?) to reach out to them, and shake them out of their golden isolation.

• T&L literature stresses the importance of EMPATHY, as a mean to “increase student learning and success”, especially in the case of ESL/EAL students (S.Cook, 2003)

• In particular, “teacher and peers empathy helps create a stronger sense of belonging and attachment in classrooms” (K.Rowell, 2015)

• The instructor is a key interface between the International Student and the alien society he/she is facing

• (Arguably?) the instructor is in a favorable position, to reach out to IS and encourage them to embrace university as a life-shaping experience, as opposed to a “skill dispenser”

WHAT CAN BE AN EFFECTIVE WAY FOR INSTRUCTORS TO REACH OUT TO IS, ESPECIALLY IN LARGE CLASSES?
**Problem-Based Learning**


- **Definition:** Learner centered educational strategy using contextualized realistic problem and peer support to enhance practical applications of what students have learned.
- **Strategy:** Enhance learning applying skills acquired in class to open problems mimicking real-life situations.

- Literature has underlined for decades the engagement potential of hands-on education. In particular, Peer interaction (collaborative projects, group discussion) is a powerful mean to process and fix knowledge acquired from text reading and front lectures *(Allen, 2001)*.
Problem-Based Learning in SFU’s Computer engineering curriculum:

• Most curriculum-specific courses feature 4h weekly labs (40 to 60% of the grade)
  • Labs consist in **PROJECTS** developed in groups
  • Projects require solution (and documentation) of real-life OPEN DESIGN PROBLEMS
  • There is a conscious effort in designing «term-long» problems whose complexity evolves with the course advancement

• The Danger: TICK-BOXING
Lab Activities are seen positively by IS, as precious tokens to be added to their CV

**BUT**

- IS avoid confrontation/interaction in labs, working most of the time from home
  - Experiments at “imposing” mandatory attendance led to disastrous results (Unhappy students, creative justifications, 70% of TA time spent in patrolling activities)

- >70% of self-organized groups reflect the ethnic background of students
  - Experiments in “forcing” heterogeneous groups led to disappointing results
    - Several IS asked for group reorganization through the term
    - Significant amount of time spent by Instructor/TAs resolving group dynamics
    - Some IS simply refused to work in group, working harder on their own rather than cooperating: We had often 3 students in the same group committing 3 independent reports …..
• For a student, *if there is a will not to do something, there is a way*: FORCING AND IMPOSING UNIFORMITY is possibly not a winning strategy to establish Emphatic Relationships with EAL speakers (Kanel, 2004)

• We would like International Students to willingly reach out to the class environment on their own terms, rather than pulling them out of the shell by sheer force
The introduction of a Lab ONLINE Discussion Board (McBride 2008, Sawmiller 2010) caused a breakthrough in effectiveness of lab activities.

- Online blogs are a natural mean of expression for International Students. They are keen to use English in blogs, and much less concerned about using broken language or expressing personal positions.

- If the proposed Lab activity is complex enough to require TA / Instructor support, IS students are more likely to seek help on a blog than in person.
  - Online Q&A Sessions managed by instructor / TA offered encouraging results.

**BUT**

- A real breakthrough in IS participation came from encouraging domestic and internationals alike to cooperate providing online support to each other, using participation points as reward.
Once involved in online participation, IS become passionate & proud about their work: this pushes them to seek further support in labs from Instructors and peers

- **Seeking peer support in labs leads to better class citizenship, and enhanced cultural awareness**

- **Seeking TA support in labs leads to enhanced learning experiences and better awareness of the value of discussion / controversy in education**

If time constraints allow, **the presence of the instructor in the lab is precious to encourage INFORMAL contact out of the formal classroom context**: once the contact is established in the lab, IS are much more likely to seek further interaction in office hours and in class

- **Spending f2f time solving problems in a lab encourages small talk, which is a key to integration in Canadian society**
• Problem based solving in Educational labs proves a powerful tool to encourage IS to break isolation and embrace active classroom citizenship

• The first spark for reaching out of isolation tends can be the need for help in solving complex assignment, especially in the case of open problems

• Online discussion blogs related to lab assignment are an amazing “first step” for encouraging reluctant IS to active participation. Invariably, online citizenship lowers barriers towards in-lab, and then and in-class citizenship

• In this process, TAs and Instructors have enormous responsibility in their empathic relation towards students: a disappointed IS will instantly revert back into isolation, and none of the excellent IS support services available in our universities will be able to fix this
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