

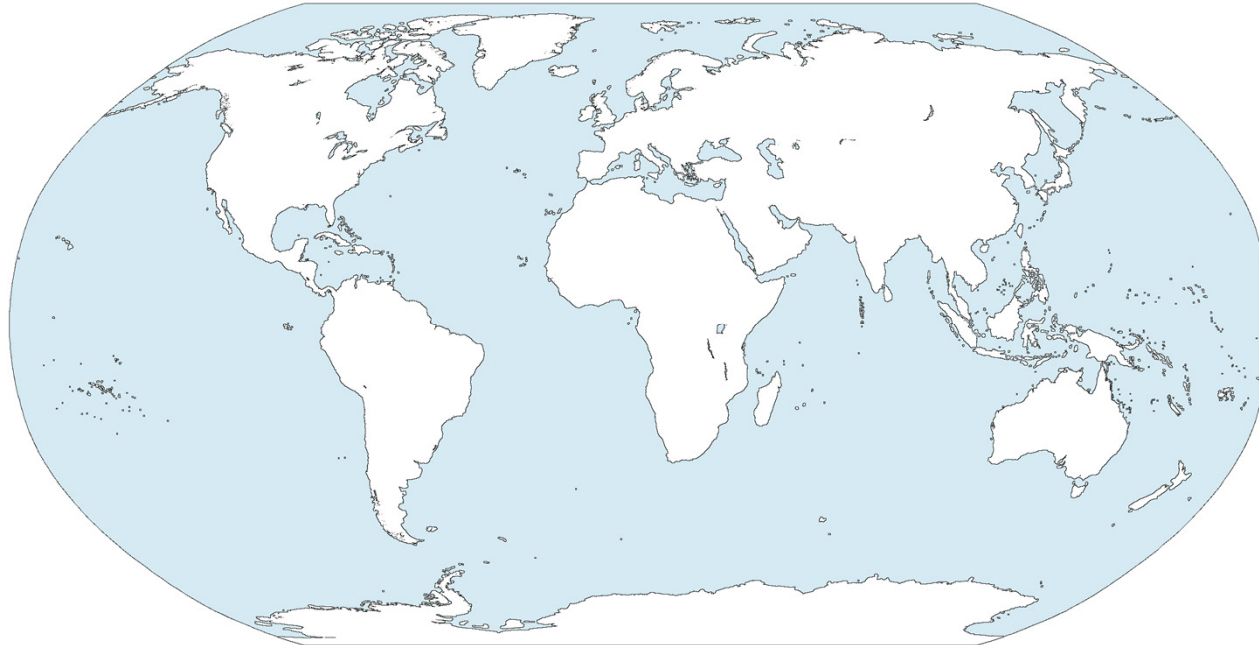
Internationalizing Teaching Practices in The Engineering Curriculum

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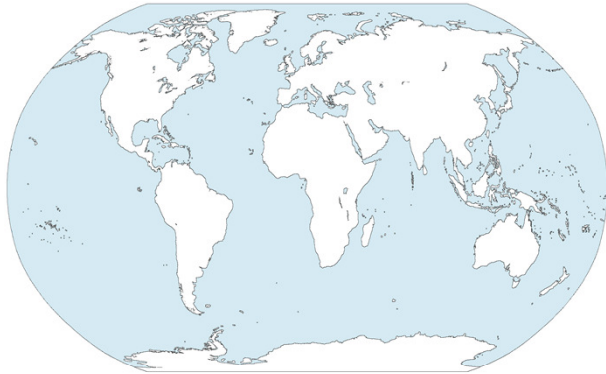


Problem Statement

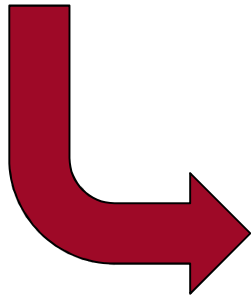


- Is this an accurate map of the world?

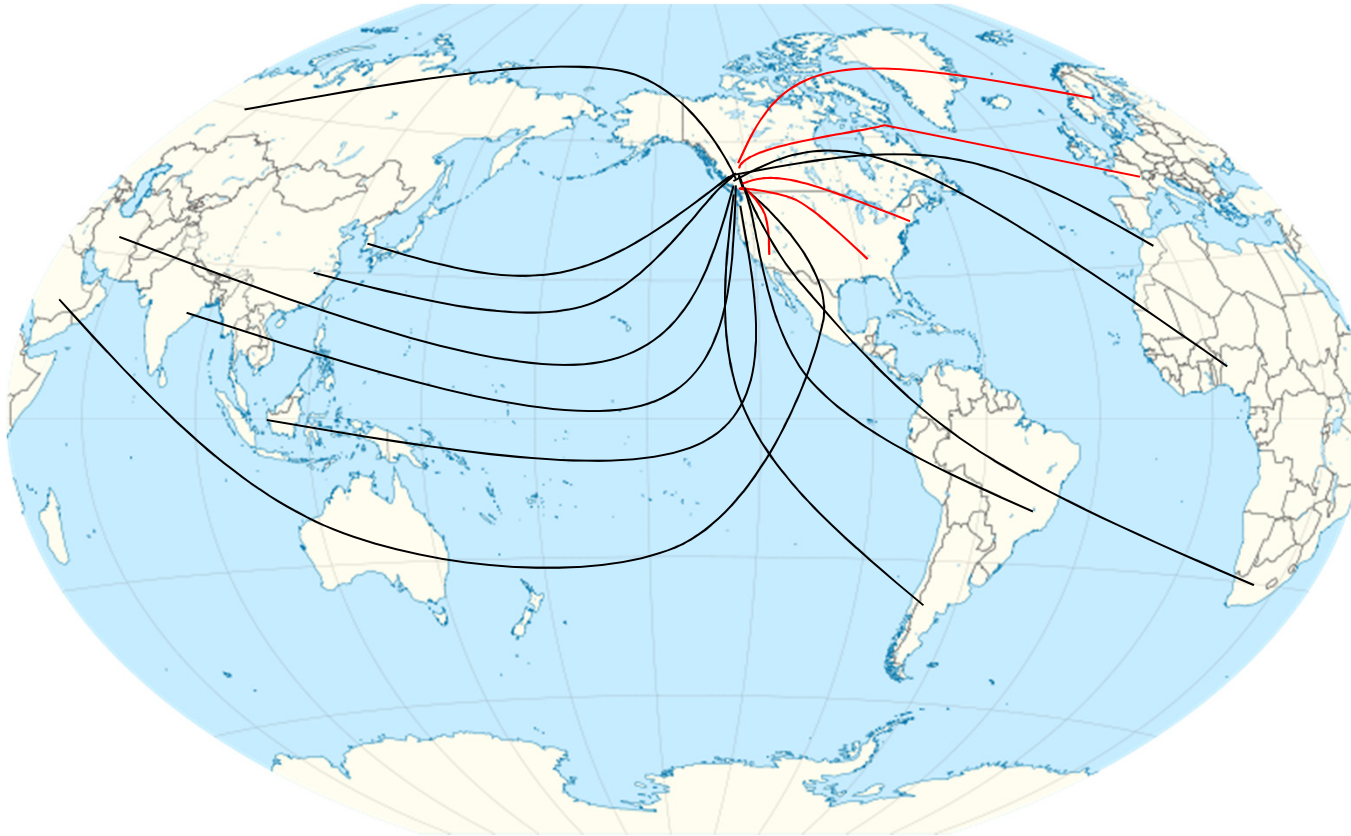
Problem Statement



- Is this an accurate map of the world?
- Given social and economic rise of pacific rim countries, this second map possibly captures global dynamics more accurately



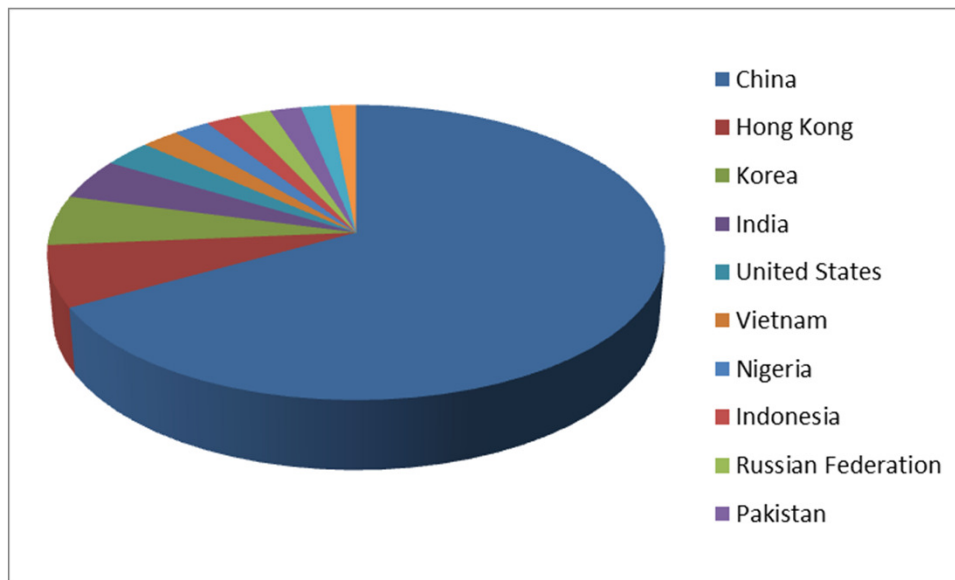
Problem Statement



- 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)

SFU 2014 International Students Report

- 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*

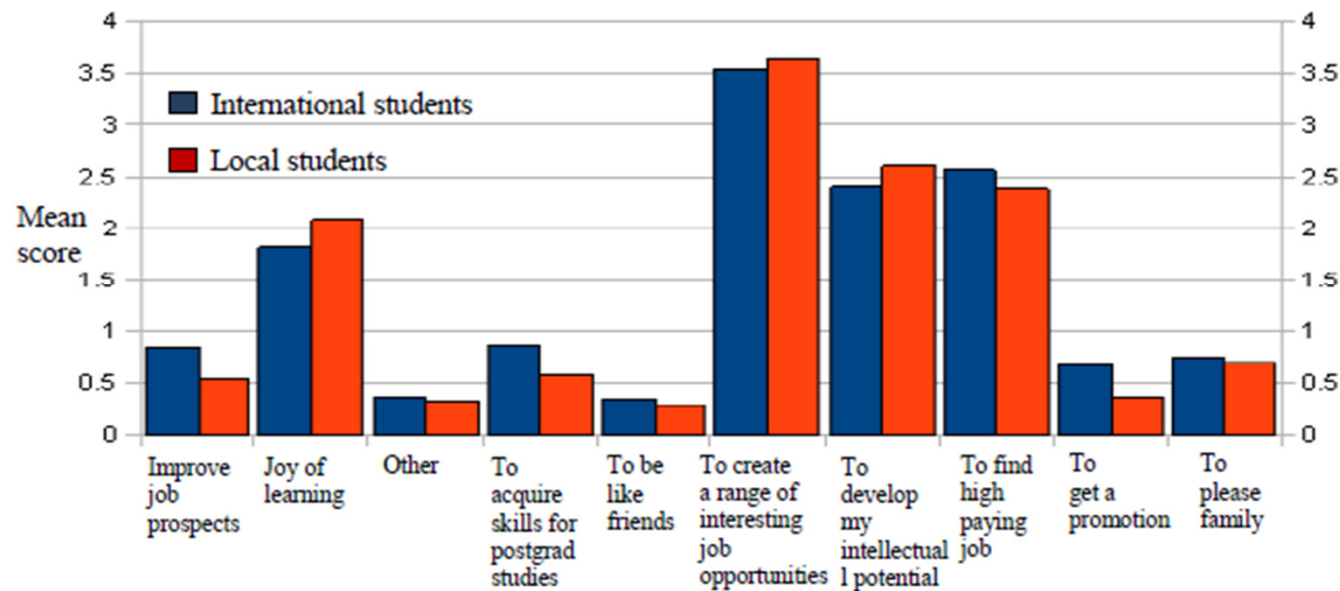


http://www.sfu.ca/irp/news/international_student_report.html

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

Motivation

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

The Danger (1): Tick - Boxing



- 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

The Danger (2): The Wall of Cultural Isolation



- *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

Problem Formulation

- International students tends 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

PROBLEM-BASED Learning (*H.S.Barrows, 1985, 2000 , H.J.Choi 2008*) :

- **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)

Context of this study: Problem-based learning in SFU Engineering Science

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



I AM SITTING IN YOUR
LAB TYPING KEYS, SO
PLEASE GO AHEAD,
GET ME MONEY AND A
POSITION

Initial Difficulties

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

Strategy



- 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

Break-Through

- The introduction of [a Lab ONLINE Discussion Board](#) (McBride 2008, Sawmiller 2010) caused a break-through 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 break through in IS participation came from encouraging domestic and internationals alike to cooperate providing online support to each other, using participation points as reward**

Benefits of the Outlined strategy

- 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*

Conclusions

- 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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