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Tweaking Engineering Education

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I studied engineering at university accomplishing 208 credit hours at three different universities. To make a comparison, a Business degree (BBA) is 120 credit hours, and an Arts degree (BA) is 110 credit hours. I was enrolled in three different branches of engineering: Mechanical, Electrical, and Civil. My grades were best in Mechanical, followed by Electrical then Civil engineering. I eventually graduated after6 years from Civil Engineering at the University of New Brunswick – the oldest engineering program in Canada. I worked with engineers from virtually every engineering university program in Canada. Canada is noted for the competence of its engineers. I felt no inferiority among them. In Canada, the engineering programs are monitored by a national body to ensure quality. It's not like the US where anyone can open a university and offer an engineering degree. Interesting that in Canada, 80% of engineers get their "P.Eng". Or professional licence. Whereas in the US, it's vice versa. In the US, professional engineering candidates must pass a set of exams to get a licence. Not so in Canada. The test monitoring is considered sufficient.

After graduating with a BScE,, I went on to work as a Project Manager in the ICI Building Construction Industry. I worked at that for only 3 and a half yeas. As a summer student, I worked for two municipalities, the Power Company in Industry, and Road and Building Construction industry. Jobs were hard to come by then, especially for a civil engineer because the governments were broke. 95% of all civil engineers work for the government directly or indirectly. I was surprised that engineers, as the boss on the project, were the lowest paid. I in fact, made less money than my doctor's secretary in Toronto. I had a friend who graduated from Mechanical engineering. He made less than the line workers in a paper mill. He quit too. Another friend worked as a structural engineer. He quit when he found out that those whom he supervised were making more money than he was.

With my varied background, I think the engineering education, although good, could be better. I think that the first two years should be common to all engineering disciplines. The basis would be Math (Calculus, Linear Algebra, Geometry, Statistics, and Differential Equations), Classical and Modern physics, physical and organic chemistry, programming and software computer science, and the history of technology. There should be room for a writing course and a complimentary studies line. These first two years should be done in continuation of High School. If you can teach a kid in grade 3 how to do long division, you can certainly teach a 20-year-old Calculus. (You must get Math and other Languages at a young age). It is the method of professing (not teaching!) that allows students to fail. It is the environment that fails, not the student.

Having the first two years in High School would bring down the student debt. Employers do not value a degree as much as the professors do. The cost is so high, that university as is an expense – a good one – but not an investment. Employers do not value the degree as much as universities charge. I was at an

Irving Oil interview and the woman said to me, "So you proven you can learn form a book. What else can you do?" Another said, "We need someone whose skills are current." My old boss – an engineer in Ontario- said there was no difference between someone with a degree and someone without!" The woman at Irving asked me why I wanted to start at the top instead of at the bottom like she did. I never got an interview for the bottom from Irving Oil despite many resume submissions.

In the third and fourth year, the engineering student should begin to learn a new technology. Universities should not try to be all things to all people. The foundation should be broad, and the technology more specialized. This is the way they do it at the Community Colleges. I always say, if you want an education, go to university; if you want a job go to Tech. University has become so expensive, that one must be able to count on getting a good paying job when they graduate.

Having an exit point after two years with a diploma is good. If the interest is not there, he two years were not wasted. A fifth year as a capstone could offer education in Entrepreneurship or Engineering Law.

The latest development in education is the Bachelor of Philosophy is good in principle, but doesn't seem to work practically. Professors are unwilling to sponsor a thesis that involves more than their speciality.

Now for the question of distance education. I have a diploma from the University of British Columbia in Real Estate Economics. I passed 13 courses and failed two. The first failure was my fault because I did not read the textbook twice. The second was their fault because the tutor gave me a 28^% on a major paper. Even though UBC put on a good course (they write their own textbooks), the tutor failed me even though I already had the diploma. Does not say much for their diploma.

UBC is ranked 2nd in Canada. UNB is ranked in the top 4% of universities worldwide. I have taken courses from 9 different universities. I do not think Distance Education really works all that well. I think universities such as UNB should have a room for engineering student s that they stay at for their tenure at UNB. That way, the student would become more entrepreneurial and engaged in the field.

UNB Civil Engineering has a Professional Experience Program (PEP). University of Waterloo has work terms staggered so that there are jobs for everyone. I think the summer jobs are adequate as is. Employers and government s are good at providing jobs for engineering students.

My 6 years at UNB did not prepare me well for the work force. I had a construction management minor that was not anything like the "real world". When I began work is when my engineering education really began. I am not so sure what an engineering degree say. Universities do not accept their own degrees as a litmus test for entry to graduate school. They require standardized test scores (GMAT; GRE; LSAT. MCAT) etc. They require letters of recommendation for supervisors or Professors. Why? What odes passing 60 courses at university really account for if not one's eligibility for gradate study?

In the High School setting, where I learned the most, students should not be passed if they do not do the work. This way, the High School Diploma would say more than it does now. Now it says nothing, with some notable exceptions. I failed grade 10 Chemistry. They gave me a "C" anyway so I could take Grade 11 Chemistry. I subsequently got the highest mark in the class with a doctor in Chemistry as the teacher. (Incidentally of the 6 courses I had to repeat or failed in my education, 4 were taught by first year female teachers) I had pretty much a straight a transcript from High School. I finished 13th in a class of 132 students in a High School that got more scholarship dollars than any other in the Maritime provinces. However, I did not get a university entrance scholarship. The teach in charge of scholarships put two classmates on the board deciding who would get what scholarship. The fellow gave his ex-girlfriend a $5000 entrance scholarship for which she flunked out. The system was grossly unfair.

To date, I have published 468 academic research papers in just about every field that universities teach. They must have done something right! But

there are absolutely no jobs for scholars in a small market. I know of PhD's who are unemployed. Although I believe in a broad education (Liberal Arts) as valuable, one must be practical enough that there is a plan for paying back the costs of education. Employers and Entrepreneurs should become engaged in determining the direction that university programs are offered. Why educate people for other markets?

So, these are some of my experiences with engineering education. I hope it is improved upon.