The Demise of the BSc

BY JASON MORRISON

During the course of my education, I have heard barbs from teachers, professors, fellow science students and even arts students about the uselessness of an arts degree. Well, to all the science students who make jokes, the joke is on you: arts students pay lower tuition yet receive a better education, and should be more employable at the end of their degree.

Yes, that is right. A liberal arts education does a better job of emphasizing and evaluating essential skills such as reading, writing and most of all, thinking, than the average science program does. Science education, even at its best, is a trade school for budding young scientists. At its worst, such as in its three year Biology or Psychology degrees, science education is a multiple choice wasteland, where students emerge with a parchment and a collection of forgotten facts, barely any more educated than when they started.

Despite this, more and more misinformed guidance counsellors and parents attempt to persuade any student with reasonable marks in high school science to pursue a BSc. Consequently, billions of public dollars are being spent with the goal of creating an educated public, yet as enrollment increases and funding decreases, the discrepancy between what the system thinks it is producing and what it is *actually* producing is widening. Doing well in university does not imply that one has mastered the skills of an educated person.

Look at the criteria used to evaluate our performance. Most Canadian science students are enrolled in the Life Sciences, represented at Dalhousie by its two largest departments, Psychology and Biology. The standard format for these courses, particularly in 1st and 2nd year, is multiple-choice testing. While we at Dalhousie get some relief from multiple-choice in 3rd and particularly 4th year, I have friends at other institutions who are not so lucky.

What types of skills does multiple choice testing evaluate? Well, largely the ability to write multiple choice tests! There is a particular art to writing these tests that has nothing to do with comprehension or articulation. While good multiple choice exams test rote learning and memorization and poor ones test for semantics or photographic memory, extremely few test for the ability to think dynamically about the material.

The most disturbing thing about multiple choice testing is that it destroys the skills that education should instill, while rewarding and reinforcing bad habits like rote learning. The point of education is to teach a person to think, not to memorize. Memorized information is only narrowly applicable as an information reference, but thinking is a dynamic and flexible skill that can be used to critically examine a novel or a scientific paper, to write a computer program or develop social policy. If you can think, then once you learn some facts (or look them up) you can use them immediately. You cannot memorize how to think. Many first year students confronted with calculus quickly learn this fact. After spending years memorizing formulas or methods to deal with math but not really understanding math, half of first year calculus students fail or drop out.

The pure sciences like Math, Physics, and Chemistry generally require true understanding over mere rote learning. Unfortunately, while students in these disciplines develop a high level of logical reasoning, an ability to work with numbers (rather than fear them), and an ability to grasp abstract concepts, it is nevertheless possible to pass through the degree without demonstrating sufficient competency in writing, speaking, and reading. While troubling, this is still a step up from the Life Sciences where there is often a more pervasive mediocrity; students can hide their weaknesses for both analytical/mathematical thinking and for reading and writing.

Science programs fail when they allow students to hide weaknesses in skills that an educated person should possess. This problem often occurs because of a fundamental flaw in the goals of the curriculum. The prerequisite courses for each field are knowledge-oriented instead of skill-oriented. Rather than designing the curriculum to ensure that graduates demonstrate competency in a set of basic skills, such as reading and writing, each department tries to merely ensure that (at some point) students have memorized a body of basic knowledge.

The tragedy of this situation is that a Bachelor of Science really should be the best, most useful undergraduate degree. The skills required of a good scientist are the skills required by an educated citizen of Canada.

It's time we stopped pretending that universities are creating an educated population. Graduating with an undergraduate degree should imply competence in a basic set of skills regardless of whether one is studying history, biochemistry or math. Presently, I see no evidence of this.

As the investment that students make in their education rises dramatically, it is becoming increasingly important that the skills they practice and develop during their education will be useful for whatever field they choose. Faculties of Science across the country have a responsibility to produce the kinds of graduates that Canada's investment in post-secondary education warrants.

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Martin and tell him all my neat ideas, and we can catch the people who don't pay what they owe. Paul won't be pleased. While he's fighting for the rights of us working stiffs, he's investing millions in a Bermuda company, tax-exempt.

I have to sit down. Running in circles makes me dizzy.