



Centre for

Teaching and Learning

Teaching Reflections

Opening speech by Leo Jonker at the Teaching Awards Reception on November 17, 2010



When Denise [Stockley] asked me to speak briefly at this celebration of teaching at Queen's, I asked her what kind of thing she would like me to talk about. She suggested that I should imagine giving my "last lecture" and say what I would most want to say as I left Queen's. This makes it the second time in a couple of years I have been asked to give my last lecture. I think someone is trying to get rid of me.

Of course, I have been at Queen's shamefully long – this is my 41st year. As I look back, I have to say that it has been a privilege to work here. I have enjoyed the academic environment, the research, my five years as department head; but above all, I

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have enjoyed my teaching. In fact, increasingly, as I became older, the choice was obvious: I could write one more mathematics research paper that would be read by a handful

of colleagues and then quickly forgotten, or I could develop and teach a good course that is valued each year by a large number of students. It was a choice between advancing my career a little, buried in a

small esoteric corner of my subject so I could publish something - a focus on self really -- or celebrating the beauty of mathematics by showing it to students - a focus on the discipline and on the students. When you are early in your career, you don't really get to make that choice, but it does present itself when your career is established. I am not saying that teaching is all celebration of beauty and publishing all career enhancement, but I suspect I am not the only one for whom the dichotomy can be described somewhat in these terms.

So what should we do as university faculty members? When we were students we were captured by the beauty of a subject – passionate enough to devote 7 years of post-secondary study to it, and in many cases 9 or more if post-doctorate study is included. This passion remains. One of the great privileges of a university career is a rich environment that allows you enormous freedom and resources to explore and

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to learn throughout your years as a faculty member. We make a mistake, however, when we assume that the majority of our students approach learning the way

most of us do – that they come at it with the same hunger. Research shows that the majority of students come to university for a career, and not for the love of



Leo Jonker speaking at the 2010 Teaching Awards Reception.

Photo taken by Kaitlin McDonald, Centre for Teaching and Learning

learning. The same mismatch of expectations characterizes universities' relationship to government and the public. The public expects us to prepare students for careers; we, on the other hand, want our students to be more like ourselves - to enjoy learning for its own sake.

I am not ready to give up on the joy of learning. I continue to believe that as a university teacher I should focus on my discipline, and not abandon the hope that it can (and will) delight students – even those who came here for a career. But to realize that hope we must allow students time to discover – to really own – the ideas we discuss with them. Otherwise we risk making our disciplines appear ugly. This certainly happens in my field, mathematics. In elementary and even in high school it tends to be taught by teachers who are more likely to consider the subject important than to think it beautiful. Under pressure from parents and school boards, teachers teach for success, often without attending sufficiently to students' understanding or delight. It is not surprising that, when we get them at university, students are more interested in a career than in learning for its own sake.

So in order to respect students' career aspirations without giving up on our desire that they should experience some of the beauty that drew us to our respective fields, we need to do two things: We should stop imagining that most students are ready to go through material at the pace we were able to manage as undergraduates; and we should real-

ize that most of them do not need to know nearly as much about our subjects as we think they do. In fact, the amount of material learned will have a much smaller effect on their success in society than the depth to which they have learned a few things. We should find a way to create a slower and more reflective pace in all our courses - one that allows our students to understand a few things very deeply.

Of course there are students who really want to become experts in a discipline. We will serve them best if we respect their hunger for learning and discovery by providing problems and projects for self-study and investigation that will teach them not only to enjoy challenging tasks but also to ask good questions, and to work in small research communities with fellow students, graduate students, and faculty members. This deeper work should not only receive additional credit, but it should receive credit that signals the depth and independence implicit in it.

I could write one more research paper that would be read by a handful of colleagues ... or I could develop and teach a good course that is valued each year by a large number of students.

Now it is not easy to set a pace that is responsive to the interests and degrees of understanding of most students. My first year course for Engineering

students is so large that the whole course needs to be planned in detail before it begins: interactive notes outlining the lectures, tutorial problems, on-line homework problems, written material to enable students' use of supporting software, an elaborate website etc. The classes are so large that you do not get to know anyone's name, and you have to be attentive to the other courses taken concurrently and using the mathematical skills presented in your course, as well as to second year courses that depend on yours. And all of the teaching has to be squeezed into 12 weeks.

I do have the luxury of one course – a child of my old age - in which I get closer to the kind of teaching I propose here. It is advertised as a

mathematics course for students who wish to become elementary school teachers. The syllabus consists of a collection of ideas that are either directly related to the grade 7 or 8 curriculum or at least accessible to students at that level. One of the course requirements is that students work in pairs to provide a ten-week, one-hour-a-week, enrichment mathematics programme for grade 7 and 8 students at a local school. The material presented at these enrichment classes is based on the course material; so the enrichment teaching becomes the main formative assessment tool for the course.

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student is engaged. The range of students' mathematics backgrounds varies enormously. Last year I had a student who had had no mathematics since grade 10! This year one of my students is a graduate student in one of the physical sciences. Working with this enormous range of backgrounds is possible because, with the grade 7 and 8 students always in the backs of our minds, we are forced to deal with problems without using the algorithms learned in high school, and because both in our group discussions and in the enrichment teaching, students who already know the material are challenged by the difficulty of explaining it appropriately to someone else.

The course has taught me that it is possible for me to enjoy a subject even when the material is nowhere near the problems that would be appropriate for a research mathematician. I have also seen how empowered students feel when they understand something for the first time – even if it is something they were expected to understand a decade ago.

A couple of years ago I had a fourth year science student say to me that he learned more in this course than in any other during his four years

at Queen's. The irony in this is that during his first year this student had taken my first year calculus course and received a very respectable mark.

Another comment made by a student recently is typical of many I have seen: "I love learning the proofs and the 'why' behind Math. It answers a lot of questions that drove me crazy at that age".

Each year there are many in the course whose prior experience with mathematics has made them intensely afraid of the subject. The student who had abandoned mathematics at the end of grade 10 was one of the many who have expressed this anxiety to me upon first joining the course. She is also among the students who, over the years, have written to tell me that the course gave them confidence that they could understand, and do, mathematics after all. Hearing other students break down problems during group activity, spending enough time on a unit to allow it to be mastered – these are among the best ways to allow students to taste, perhaps for the first time, the pleasure of understanding some few ideas in a subject that previously seemed arbitrary and inaccessible.

I am sure that many others in this room have had grateful letters or comments from students in their

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courses, and that all of you have the kind of commitment to your subject and to your students that would welcome an opportunity to create something that allows for really

deep learning even if the coverage is less extensive than our curricula often demand. If we had a culture at Queen's that more readily recognized the significance of this kind of learning we would be doing both our subject and our students a great favour.

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