The Revitalization of Undergraduate Education in Canada

A report on the AUCC workshop on undergraduate education in Halifax, March 6-8, 2011

Table of contents

Photo: University of Prince Edward Island

The Revitalization of Undergraduate Education in Canada

Introduction

It could be claimed, reasonably, that Canada's universities have had a good run over the past 15 years. During that time, the university sector in Canada has experienced strong growth in student enrolment, with roughly 900,000 undergraduate students currently enrolled full-time. Government support for university operating costs has doubled from $5.4 billion to $11.1 billion and the number of faculty at universities has grown by about 6,000 full-time positions to address this increase in enrolment. Rounding out the picture, again over the last 15 years, there has been a nearly four-fold increase in federal funding for university-based research: from $1.2 billion to $4.2 billion.

Despite these successes, there are some within the university enterprise who feel that Canada's universities collectively have <u>lost their way</u>. Their concern is that our institutions are not devoting sufficient attention to what is arguably their central role: offering a quality teaching and learning environment to their undergraduate students. Robert Campbell, president of Mount Allison University, captured that sentiment in a recent address: "We all feel and know that the character of the undergraduate experience has deteriorated in our lifetimes, especially so in the last decades. And we know in our heart of hearts that this experience can and should be much better."

The venue for Dr. Campbell's remarks was the workshop, "Transforming Canadian University Undergraduate Education," held in Halifax, Nova Scotia, on March 6-8, 2011. Organized by the <u>Association of Universities and Colleges of Canada</u> with the support of the University of Manitoba's <u>Centre for Higher Education Research and Development</u>, it was a signal event for Canada's universities. Sixty-five participants attended, including 13 university presidents, 25 vice-presidents (academic) and provosts, and 15 designated student representatives. Twenty-four universities were represented, running the gamut from smaller, primarily undergraduate universities to several large research-intensive institutions.

The discussions at the Halifax event were far-reaching, frank and thought-provoking. Recognizing that government resources are likely to be limited and that public expectations continue to rise, the program organizers asked participants to explore and share ideas on what works in undergraduate teaching, what doesn't, and what new initiatives can be implemented and scaled up at all types and sizes of institutions. The program was not intended to arrive at definitive conclusions, but rather to identify concerns related to the provision of undergraduate education and options for improvement.

A new narrative

Paul Davidson, president of AUCC, said the impetus for the workshop came partly from a mandate the association has received from its members to develop a "new narrative" regarding higher education in Canada. Undergraduate education has been identified as one of the priorities of the new narrative and the workshop discussions will help to inform this process.

There was also a sense from members, said Mr. Davidson, that the large increases in enrolment seen in the past 15 years have produced new challenges for institutions in terms of teaching and learning that were not being adequately addressed by the association. "We have heard from members that AUCC over the past 10 to 15 years has talked about a narrower and narrower set of issues," Mr.

Davidson said. "All our members across the country, without exception – be they from large institutions, small institutions, Anglophone, Francophone, new or older – are increasingly preoccupied about what it is that students are actually getting from their undergraduate experience."

Responding to that sentiment, AUCC held two sessions on the undergrad experience at the association's spring meeting in Montreal in 2010. Both sessions quickly filled up, with attendance from a broad range of member institutions and very animated discussions. "For both sessions, the closing plea was: this was the first time we've talked about this in years, and please don't let this be the last," Mr. Davidson said.

A group was subsequently formed to draft a program for what was to become the Transforming Canadian University Undergraduate Education workshop. The group consisted of David Marshall, president of Mount Royal University in Calgary; Richard Gale, director of the <u>Institute for Scholarship of Teaching and Learning</u> at Mount Royal; Patrick Deane, president of McMaster University; and Pierre Zundel, president of the University of Sudbury.

Drs. Deane and Zundel authored a feature essay for the January 2011 issue of *University Affairs* magazine entitled "<u>It's time to transform undergraduate education</u>." In it they claimed, "What is required is a radical re-conceptualizing of the teaching and learning process, where the goal becomes 'helping students learn' rather than 'teaching.' We need to lift ourselves above the instructor-instructed dialectic, and above that equally factitious binary of teaching and research."

Setting the stage

Mount Allison's Dr. Campbell set the tone at the Halifax workshop in his opening keynote address. The "promise" of universities, he said, both to society and to individuals, rests on "the quality and effectiveness of the undergraduate student experience." Yet, the pre-eminence of undergraduate education, its centrality to the institution, has been neglected, he said. "For many university presidents and senior administrators, their experience over the past decade has been a frustrating one. … In my view, the collective university membership has lost its way over this time."

Dr. Campbell summarized what universities have gone through over the past few decades:
- Massive enrolment pressures;
- Cyclical waxing and waning of government support;
- Funding and revenues that have not kept pace with costs, which have been driven by unionization, professionalization, technology and growing expectations from government and the public;
- Growth in campus facilities and the pressures of deferred maintenance;
- And increased expectations of collegiality, accountability and transparency.

Paralleling this experience has been "a secular shift in governments' PSE expectations" to a focus on "outputs" and "impact" on issues like productivity, innovation, competitiveness and commercialization. "Governments in the mid-1990s and after, particularly the federal government, offered financial incentives for universities to embrace their agenda. So it was pretty much inevitable that universities, with AUCC's help, would shift our focus and attention to ever-narrowing policy and financial issues, to help maximize the revenues from research and related areas to help to keep ourselves afloat."

As a result, "the focus has been way down at the end of the university funnel: at graduate studies, R&D, big science. All the while, in my view, we increasingly neglected to consider what was going on way back upstream at the entrance of the funnel that feeds and generates the high-end outputs," Dr. Campbell said. In the process, "we likely lost the foundational narrative thread…We lost sight of the broader promise of the universities and lost connection with our broader communities."

Caution, but not crisis

McMaster president Dr. Deane echoed the views of many at the workshop by welcoming the AUCC initiative to examine the undergraduate experience. But he also struck a cautionary note: "We have a long history of moments like this where the consciousness briefly awakens and there is a discussion about undergraduate education, and then somehow it recedes again until the next time."

Dr. Deane exhorted participants to "put everything" up for debate. "Dispiritingly, the focus is often on the quality of teaching. But we must alter the system in which the teaching occurs – not just the modality of learning, but the whole conception of the learning process. I am greatly demoralized that we have failed to get outside of the established paradigms. I just don't think we should settle for a perpetuation of what we've done and sink back into torpor."

Most speakers at the workshop did not think that the university system in Canada is in crisis. But there was a strong consensus that the current situation is not sustainable and that the system must change.

Several participants noted that there seems to be little perception or understanding among the general public that there is a problem; students and their families generally continue to express high satisfaction with the education received. This has helped to feed inertia to change and a yearning for past ideals as opposed to creative rethinking in the current context. This lack of urgency, in many ways, "makes our work harder," said Ramona Lumpkin, president of Mount Saint Vincent University. Nevertheless, there was a strong sentiment by the speakers that universities can and must do better, and that change must start with the commitment of institutional leaders.

Defining student outcomes

There are many challenges – structural and cultural – which impinge on the ability of universities to deliver a quality learning environment to undergraduates. But, for a proper discussion of what works, what doesn't and what needs to change, universities must first decide what it is that students should be getting from their education. There was a near-universal agreement by participants to the Halifax workshop that universities need to think in terms of learning outcomes and to devise methods for assessing whether these outcomes have been achieved.

This, in turn, raised much discussion of what outcomes are desirable for students taking an undergraduate degree program. Among those identified were:

- Students who can think, read and write critically;
- Students who are both literate and numerate across the curriculum;
- Students who are comfortable in presenting their views and who possess an ability to back-up those views through analysis.

It was generally agreed as well that students should experience an interdisciplinary education with broad exposure to various fields of knowledge. Curricula should promote general, transferable skills, rather than simple career or job readiness. Much technical or procedural knowledge is narrowly focused and may quickly become obsolete.

Along the same lines, participants identified as a key outcome the ability of students to contribute to society. They noted that there can often be too much focus on vocational/professional training and occupational outcomes. It was acknowledged that graduates want jobs, but there's no reason universities can't prepare students for a job *and* also prepare them to be good global citizens.

The assessment of learning outcomes is a complex task. There are many groups and organizations attempting to answer the question of what students are learning – or, at least, what they *should* be learning – when they take a degree program. The Lumina Foundation in the U.S., for example, has proposed a Degree Qualifications Profile, also called simply a Degree Profile, which is described by the foundation as "a framework for defining and ultimately measuring the general knowledge and skills that individual students need to acquire in order to earn degrees at various levels."

The degree profile proposed by Lumina is similar in concept to the degree qualifications frameworks being championed by the European Higher Education Area and which form a part of the Bologna Process on transforming higher education in Europe. Like the Lumina proposal, the qualifications frameworks in Europe seek to itemize and quantify the learning outcomes expected from a degree program. Canada does have a degree qualifications framework, endorsed by the provincial ministers of education in a statement on quality assurance adopted in 2007. The framework was adopted by the Council of Ministers of Education Canada as a way of assessing both new degree-granting institutions and new degree programs, to ensure that they meet "appropriate standards." The guidelines, however, are not binding, are little-known, and have not had a great deal of impact.

Challenges to change

Although individual participants might characterize the situation somewhat differently, there was a strong sense from many workshop attendees that over the past 15 years there has been an imbalance in the emphasis placed on university research, to the detriment of teaching and learning. Research outputs are routinely recognized in tenure and promotion decisions, while teaching excellence is often perceived as having lesser value and conferring less prestige.

One president expressed the frustration that many feel about this research focus. One of the most important issues for any university is its reputation, he said, "but let's face it, its reputation is not built on teaching. The things that really determine the reputation of our institutions right now are research and attracting high-profile talent and big infrastructure. What doesn't count is teaching, the local interests, engaging in civil society."

Asked to categorize the main barriers to change in their institutions, the participants identified the following as among the key obstacles:

- Faculty hiring procedures and rewards structures which value research over teaching;
- A research-teaching divide;
- Faculty workload, unionization and resistance to change;
- Institutional barriers to innovation in course delivery and curricular reform.

As regards the latter, many said that universities should give faculty and students more space to take risks, innovate and make mistakes. While innovation in course design is important, many faculty members don't want to get penalized for taking such risks, especially if they don't yet have tenure. Likewise, students were characterized as being "quite conservative," focused mainly on marks and resistant when professors try something new and different.

Other obstacles identified include:

- The overall size of many universities, which has become problematic;
- Large class sizes and an increasing student-teacher ratio;
- Limited student-faculty interaction;
- A lack of student readiness;
- Financial pressures which force students to work greater hours at part-time jobs and study less;
- The increasing use of contract teaching.

Many see the use of contract teachers – also called contingent or part-time faculty – as a particularly pernicious issue. There are, however, no accurate statistics on the percentage of those teaching at the university level in Canada who are non-tenure-track, contract workers. Some estimate that the number of part-time faculty is at least equal to the number of full-time tenured or tenure-track faculty.

Marie Vander Kloet, an instructor in the department of communications, popular culture and film at Brock University, was an invited speaker at the Halifax workshop and described her experience as a contract teacher. The biggest challenge for someone in her position to be innovative in the classroom and build rapport with students is that "the relationship we have with the university is very tenuous." There are, she said, a tremendous number of hurdles: "I can't access the library system at the university until the first day of my contract, which is typically six days before I start teaching. So I can't set up my course website. I can't figure out what I could potentially put online. I can't activate my e-mail address. … I know there are huge financial constraints in terms of why there are so many contract faculty," she concluded, "but there are material conditions around those contracts which severely impact how it's possible for us to teach."

Solutions and new approaches

Many would agree that teaching is more of an art than a science. As such, it can be difficult to identify and quantify what works and why. There was a general call, therefore, at the Halifax conference for more research and *evidence* of good teaching and learning practices. There are many dedicated educators who are trying to provide that evidence through the scholarship of teaching and learning (or SOTL). Richard Gale, formerly a senior scholar with the Carnegie Foundation and now at Mount Royal University, said for it to be properly constituted as scholarship, SOTL must go beyond simple tips and observations of what works for professors in their own classrooms. It must be a formal, systematic process of inquiry that provides evidence of what works and why, and that evidence must be disseminated, critically reviewed and built upon, much as one would do with any other type of scholarship.

The Society for Teaching and Learning in Higher Education has identified SOTL as one of its strategic directions and last year launched the Canadian Journal for the Scholarship of Teaching and Learning. Yet, while SOTL is far more widespread now in Canada than it was just five years ago, it is

still occurring mainly in "pockets" and has not yet become "the kind of national movement that we'd hoped," said Dr. Gale. Among the challenges facing SOTL is a lack of funding for this type of research and a lack of understanding regarding the potential benefits of SOTL, and hence a lack of recognition for these efforts at the institutional level.

Nevertheless, there is much evidence of what works to improve teaching and learning. The National Survey of Student Engagement, developed by the Indiana University Center for Postsecondary Research and used by many Canadian postsecondary institutions, has popularized the concept of student engagement as a key ingredient to learning success. Alexander McCormick, director of NSSE, was an invited speaker at the Halifax workshop. He said NSSE was created to "enrich the impoverished national discourse on university quality" and to provide diagnostic information to universities.

According to NSSE, there are two critical features to student engagement. The first is the amount of time and effort students put into their studies and other educationally purposeful activities. The second is how the institution deploys its resources and organizes the curriculum and other learning opportunities to get students to participate in activities that research studies show are linked to student learning.

More than 1,400 different colleges and universities in the U.S. and Canada have participated in NSSE since the survey was first administered in 2000. The results provide an estimate of how undergraduates spend their time and what they gain from attending university. The survey has 42 key questions meant to capture how an institution is doing in terms of five Benchmarks of Effective Educational Practice. The five benchmarks are:
1. Level of academic challenge
2. Active and collaborative learning
3. Student-faculty interaction
4. Supportive campus environment
5. Enriching educational experiences.

Faculty, staff and others can use NSSE results to improve the quality of the undergraduate experience, and each year more campuses use their NSSE data in innovative ways, said Dr. McCormick. Some of these examples are captured in the biennial publication, *Lessons from the Field*.

At the Halifax workshop, many participants recognized active and collaborative learning activities and other "enriching" learning experiences as key components to a rewarding student experience. Among the activities cited:
- internships or field experiences
- cooperative education programs
- meaningful undergraduate research exposure
- problem-based learning
- service learning and community-based educational experiences
- study abroad and other international experiences
- independent study or self-assigned study
- co-curricular activities
- learning communities

Community service-learning (or CSL) is one example of an enriching, active learning experience. CSL is an educational approach that integrates service in the community with classroom learning activities. Known by a variety of terms (e.g., service-learning, community-based learning), CSL programs are most effective when they include key elements drawn from experiential education theory, especially developing critical thinking and intentionally facilitating reflection. Carefully designed and implemented CSL programs and courses help students take meaning from their community experiences, connect experience outside of the classroom to more theoretical study, and develop social responsibility and leadership skills.

Community service-learning has been growing rapidly in Canada and the Canadian Alliance for Community Service-Learning now lists about 50 CSL programs in Canada. One participant in Halifax commented that students "come in droves" to his institution's CSL offerings. However, he cautioned that "we have been challenged by faculty to get buy-in because of tenure and promotion considerations." As well, CSL – like many high-impact, quality learning activities – generally requires additional time and resources from departments and faculty who already feel overburdened.

The role of university leaders

Many participants commented that, for change to occur, leadership on these issues must come from the top – from the president on down. From various sessions and discussions, here are some key points related to the role of university leaders in transforming their institutions to ensure a quality undergraduate student experience:

- Focus on institutional and cultural change, not just on more funding. Today's quality challenge is really a "design and funding allocation" issue, said one university president. Universities need to think of what new, non-financial resources can be put into play, e.g., "students can be teachers as well as learners." Examine internally how to reallocate resources in times of fiscal restraint.

- Re-imagine student learning and focus on altering the system in which teaching occurs, not just on improving the quality of teaching in the current system. Canadian universities should rethink what constitutes a course of study and where it takes place.

- Develop integrated institutional plans: combine teaching and learning plans with research plans; integrate the professional services offered to students (career and financial counseling) with faculty discussions to better address the material pressures facing students that affect their undergraduate experience.

- Support the scholarship of teaching and learning through new funds, reward and recognition, scaling up successful, innovative practice and sharing results.

- Ensure that faculty engagement is seen as being as important as student engagement. How to engage faculty in a meaningful conversation to implement change is a key challenge, especially in heavily unionized university environments and given the reality of part-time/full-time faculty ratios.

- "Safe spaces" need to be created for faculty to try innovative approaches to teaching, and these attempts at innovation should be included in merit reviews.

- Alternative career paths, including teaching-only streams, should be considered. As well, department hiring committees and review processes should add criteria that include innovation in teaching and learning, not just research output, in tenure and promotion decisions. Good teaching must become an institutional/cultural issue.

- Part-time faculty need to be given value and efforts must be made to ensure they have the tools and support needed to deliver quality teaching.

Participants discussed the issue of institutional differentiation when it comes to offering a quality undergraduate student experience (re: small, primarily undergraduate institutions vs. large research-intensive institutions). Given external pressures, some warned of the increasing homogeneity of the system. Others talked of the importance of a discourse that reinforces the concept of an "ecosystem" or "spectrum" of institutional approaches within a larger system. Several argued that we need to celebrate the diversity of our system and that all institutions must carefully examine how to ensure a quality undergraduate experience and student success within their specific context.

The student perspective

Student representatives shared their top priorities for change in several discussions. Their primary focus was on curricular reform to increase interdisciplinarity, breadth of programs and more learning experiences for credit outside the classroom. Student representatives also said they would like more dialogue with administrators and to have more meaningful interaction with faculty in course design ("We're all on the same side," one student commented).

Specific recommendations included:
- Expose all students to a range of learning methods, including interactive and participatory methods, not only across courses but within courses;
- Increase opportunities for internships and co-op terms;
- Include self-reflection as part of meeting learning outcomes;
- Increase opportunities for students to help each other;
- Promote the use of achievement portfolios and co-curricular transcripts.

Students were also subjected to some criticism by participants. These included:
- Students need to change how they're thinking about their education, focusing more on the experience and not the credential;
- Students' groups are missing the mark by focusing mainly on tuition as a public policy issue;
- Students need to be more challenging and demanding in terms of their educational experience.

The path ahead

Wrapping up the proceedings at the end of the two days, Ray Ivany, president of Acadia University, caught the mood by saying, "You could declare the last several days a success on a number of dimensions, simply by drawing the university community together around this theme at this time and the robust discussion we had." But, he stressed, this is not enough.

AUCC President Paul Davidson encouraged participants "in your own roles at your own institutions, to think about how change can occur." He noted that the deliberations of the undergrad workshop will feed into AUCC's priorities over the years ahead. As well, AUCC has a standing committee on educational issues and funding, so there is "a home institutionally within AUCC for these issues to keep moving forward," he said.

Arshad Ahmad, a business professor at Concordia University and president of the Society for Teaching and Learning in Higher Education, called the Halifax workshop "an important milestone" and said it left him inspired and encouraged. "It is so important to hear, from president after president, that the core business of the university is to teach undergraduate students," he said. His colleagues within the STLHE "are so happy to learn that this kind of language is being used and that people are getting serious." In their efforts to improve undergraduate education, "these presidents have so many allies. This will resonate with a lot of people who want to support this narrative." (In a recent opinion piece at universityaffairs.ca, Dr. Ahmad offers "Six suggestions to presidents to improve undergraduate education.")

There are, of course, many good examples of innovation in teaching and learning already happening at Canada's universities. Some of these programs are highlighted in the case studies presented along with this report. These efforts need to be encouraged, built upon and made sustainable, said participants.

Governments, too, seem to be starting to recognize the importance of improving the undergraduate experience. The government of Ontario, for example, recently announced its plans to "develop new programs and incentives that help improve teaching quality and reward excellence" and to "place more emphasis on programs at colleges and universities that promote experiential teaching and learning, such as co-operative education, internships, undergraduate research opportunities and international exchanges."

At the workshop's close, Mr. Davidson said, "This is not just about rhetoric. We are actively searching for new policy tools, new policy ideas … to ensure that Canadian universities are equipped to make the next generation of students the best educated and the best prepared to meet the challenges that this country is facing."

Looking ahead to the 150th anniversary of Confederation, Mr. Davidson noted that between now and 2017, a further one million students will graduate with an undergraduate degree. "What experiences do we want them to have so that they, their families and their communities prosper? We've got our work cut out for us."

Appendices

Appendix A:

Setting First-Year Students Up for Success: University of King's College Foundation Year Program

It's been around for nearly 40 years and deals with some of the oldest texts of Western civilization.

But the Foundation Year Program at the University of King's College in Halifax continues to offer a fresh approach to the Western tradition's core literature and ideas, immersing 300 first-year students annually in a seamless, interdisciplinary experience that remains a flagship program for the university.

"It's a great books program," says Daniel Brandes, who was a student in FYP 20 years ago and is now its director. "We assume that what matters most for young students is encountering these primary texts so that later in their university careers, when they begin to encounter secondary scholarship, they'll have a proper basis for judging its value."

Students consider the development of Western thought and civilization through the multiple lenses of philosophy, literature, history, natural and social sciences, music and mathematics. The program takes up the bulk of their year, comprising four full-year courses for arts, journalism and music majors – who take just one additional full-year course -- and three for science students, who take another two science courses.

Student Hilary Ilkay calls the FYP "one of the most challenging, exciting, rewarding experiences I've ever had. It was completely life-changing."

The program's reading list drew her away from her original idea to study in her hometown of Toronto. But Ms. Ilkay says the block scheduling of classes – daily two-hour lectures in the morning with a small group tutorial after that and Tuesdays off – also deepened her learning once she got to King's.

The fact "it's all laid out for you," made the transition to university easier, says Ms. Ilkay, who has gone on to major in classics as a result of her FYP experience.

Instead of studying texts thematically, the year is divided into six historical periods done in four-week blocks, beginning with the ancient world – including the Bible and Plato's *Republic* – and ending in contemporary times, with works such as Eliot's The Waste Land and Freud's New Introductory Lectures on Psychoanalysis.

Students are exposed to about 60 texts over the year and produce an essay every two weeks, with intense focus on improving their writing skills.

What makes it possible to deliver the program is a combination of teaching fellows, senior fellows, and assistant professors, as well as fully-tenured professors, all of whom also run tutorials. Ordinarily only tenured professors run first-year courses at King's.

Tutorials are the heart of the program because, with 15 or fewer students, they allow even the quietest ones to develop their own voice and become more confident in their ideas and analytical skills.

"Once they've found their feet, they're much more successful for the rest of their university career," says Dr. Brandes.

For more information on King's Foundation Year Program, go to: www.ukings.ns.ca/foundation-year-programme

Appendix B:

Eliminating the Research and Teaching Divide: McMaster University's iSci Program

At McMaster University, teaching and research are not seen as mutually exclusive activities competing for attention, but two sides of the same coin.

Its Honours Integrated Science Program – called iSci – is a recent example of how the university is combining engaging teaching and learning with research opportunities for both students and faculty. Heading into its third year in 2011, the four-year program exposes undergraduate students to big scientific questions right off the top, in a bid to introduce them to the challenge and excitement of scientific research, encourage them to think about those problems from a range of disciplinary perspectives, while also equipping them with a strong knowledge foundation along the way.

"The program has surpassed our expectations. It's very exciting," says John Capone, McMaster's dean of science, and the main driver behind iSci's creation.

At iSci there is less focus on traditional lectures and more opportunity for problem-solving and experiential learning. Admittedly an elite crop of highly-motivated, high-performing students (this year's first-year class is 43; the program expects to accept up to 60 students in future), beginning iSci students go through an initial six-week primer on core content and skills in six scientific disciplines. They move on to their first in a series of research-focused modules, such as planning a "Mission to Mars," or designing cures for cancer. Students are exposed to all of the same content a first-year student carrying a traditional science course load would, only in an integrated fashion.

There are frequent teaching seminars throughout the week, guest lectures, field trips, labs, as well as scientific literacy sessions designed to give students oral and written skills so they can become good scientific communicators and facility in the use of scientific literature. As they move through the program and learn what interests them, iSci students are able to take more elective courses in specific disciplines in upper years.

The program has not required a significant amount of extra money – although the university is spending funds to build it an interdisciplinary science lab. It has been accommodated on a floor of McMaster's science library – a strategic move in itself, emphasizing the library's teaching value – and is considered to be a component of every science department, each of which is expected to contribute to it.

ISci teaches through research, says its director, Carolyn Eyles. While students do much of their learning through research, the program is also stimulating new research into teaching pedagogy, and iSci teaching staff use their research in their instruction, integrating new research initiatives into their teaching.

That's part of the McMaster way, and iSci is not the only program striving to combine research with student-centred learning, says Ilene Busch-Vishniac, McMaster's provost and vice-president academic. The university, known as a pioneer in problem-based learning, has also made changes to how it assesses faculty's teaching contributions and has embarked on discussions involving its teaching award winners to look at how the university can further recognize and promote the importance of high-quality teaching.

"Best practice says teaching and research should be integrated," says Dr. Busch-Vishniac, adding that a limited amount of literature on the subject shows that, "most of the time, the people who are stellar teachers are also stellar researchers."

And experimenting with new approaches to teaching students is all a part of that piece.

"We are very interested in playing, and seeing what works," she says. "We will certainly have failures. But we will also have some whopping successes, like iSci. That's okay. That's the way research is done and that's the way we make progress."

For more information on iSci, go to www.science.mcmaster.ca/isci/

Appendix C:

Training a New Kind of Physician: Problem-Based Learning at the Université de Sherbrooke

Thirty years ago the Université de Sherbrooke's medical school faced a challenge: its curriculum was becoming increasingly content-heavy as medical knowledge continued to advance. Yet the traditional lecture-based approach to getting that information into students' heads was becoming less and less efficient with every new curriculum addition. Students were overwhelmed, uninspired and lacked sufficient opportunities to apply their book knowledge to real life healthcare situations.

After several years of discussion, reflection and planning, in 1987 the university became one of the first in the world to do a full-scale conversion of its medical school curriculum from one that was traditionally-based to one that used problem-based learning (or PBL) as its central pedagogical approach. For guidance, it drew on the examples of McMaster University, which had pioneered PBL at its fledgling medical school nearly 20 years before, as well as Maastricht University in the Netherlands, which started up PBL in the mid-1970s.

The change was made with adjustments to the school's operating budget, but without any extra money. Nevertheless, strong leadership and faculty training in teaching methodology were essential, says Paul Grand'Maison, Sherbrooke's outgoing [as of October 2011] vice-dean for undergraduate medical education and a participant in the 1987 curriculum overhaul.

"Money is not the most important," says Dr. Grand'Maison. "It's the commitment of the people."

That commitment was toward a much greater proportion of small group learning opportunities, developing students into self-directed learners, and emphasizing a community focus, training students to be sensitive to the needs of the patients and communities for which they would eventually care. Over time, the medical school administration and faculty have gone through periodic reviews and changes to the curriculum, but active and small-group learning have been mainstays.

"We like to say that our curriculum is always in motion," says Dr. Grand'Maison.

Under the previous system, a standard teaching unit in cardiology was taught over five or six weeks, using about 25 hours per week of lectures. With PBL, the unit is still taught over five weeks, but students are presented with 10 problems – two a week – that they must solve using a combination of analysis, self-directed learning, and small group discussion. Lectures are cut down to four hours per week. Small groups are a maximum of eight students, with the faculty member acting as a facilitator, rather than a lecturer.

The results? Sherbrooke medical graduates have continued to score well on national tests and at least one study found the change to a community-oriented, PBL approach resulted in significant improvement in preventive care and continuity of care. The medical school has been recognized for producing a high percentage of graduates who choose, and remain at, rural practices, where greater resourcefulness is an essential skill (students must do at least one-third of their residency outside of a major teaching hospital). Students comment that the use of active learning and small groups has been a highlight of their educational experience. In 2006, the school expanded its program to two other sites – in Saguenay, Québec and in Moncton, New Brunswick – bringing the total number of students per annual class to about 200.

None of this happens without faculty training of course.

As Dr. Grand'Maison puts it: "Faculty development is a long-term capacity-building activity that never ends."

Pedagogical workshops spanning from a half-day to two days are compulsory for teachers new to the medical school and refresher courses are offered annually. Lengthier courses and study programs in medical pedagogy are also offered, with the hope that they will be a training ground for future medical education leaders. In 2001, the school became the only one in Canada to be designated a World Health Organization Collaborating Centre on Health Science Education and Practice.

Faculty who wish to be promoted within the school can move up only if they are engaged in the medical education program. And in a bid to better recognize the importance of teaching at the faculty, a practice plan approach to compensation is used. Faculty members pool their university and clinical compensation and the funds are redistributed according to a formula that recognizes each member's combined efforts in teaching, administration and research.

This has "put education in its rightful place," says Dr. Grand'Maison. "We want to make sure that we recognize the task of education as an important one."

Appendix D:

Let's Talk: Simon Fraser University's Undergraduate Semester in Dialogue program

No lectures are allowed in the Undergraduate Semester in Dialogue program.

Marks are scarce too. Students are informed at the program's start they'll receive no grades until the end of the semester.

What they get instead is "intense feedback," plenty of discussion, writing, re-writing, group and individual projects and, if successful, that precious "A-ha!" moment that changes a student's life.

"Our program doesn't propose overthrowing the entire university system," says Mark Winston, academic director and fellow at SFU's Centre for Dialogue. Dr. Winston created Semester in Dialogue in 2002 after reaching a mid-career realization that, although he was a pretty good lecturer, his students were not engaging with the material.

"What we're missing are the catalytic moments through which students discover who they want to be in the world," says Dr. Winston, also a bee expert, who believes just about any program can benefit from replacing 10 per cent of its traditionally-taught curriculum with an experiential component.

Semester in Dialogue sets the scene for those transformative moments by inspiring and encouraging students' civic engagement with contemporary challenges. Each semester is based around a theme such as urban planning and sustainability, energy, or healthcare. Using an interdisciplinary and experiential approach, the program treats dialogue, among students, with guest speakers – called "thought leaders" – and in regular public forums organized by students, as a primary learning tool. "Dialogue" sessions are scheduled frequently during the week.

The program is small – 20 students in their third or fourth year are accepted in each of the three semesters the program runs during the year – and counts as three simultaneous courses in the fall and winter; two during the spring semester. Rather than being based with any one department, the program reports directly to SFU's vice-president, academic, which has given it the independence needed to develop the program to the fullest.

Students are expected to come to dialogues already well-read in the discussion topic. There are regular field trips in the Vancouver area, weekly one-on-one mentoring meetings with faculty, and a final project of a 3,000-word manuscript or equivalent, suitable for public presentation, among many other written assignments (including writing an op-ed piece for a daily newspaper).

Former Dialogue student Deanna Rogers saw her course project – designing and implementing a community "zero waste model," minimizing what gets thrown away, whether through garbage or recycling – turn into a summer job after a local government agency funded her to run the model in her neighbourhood.

She says the program, "taught me a lot about communication skills, facilitation, how to work with a group. I feel like it taught me how to learn again."

The program has helped inspire CityStudio, involving SFU with five other Vancouver postsecondary institutions, and getting students to work directly on Vancouver's sustainability issues alongside city officials, experts and community members. CityStudio will launch in the fall of 2011.

For more information on the Undergraduate Semester in Dialogue program, go to:
www.sfu.ca/dialog//undergrad

Appendix E:

Keeping Innovation Going: University of Guelph

How does good get even better?

That was the intention when University of Guelph provost Maureen Mancuso released a white paper in 2005 called "The Lighting of a Fire: Re-Imagining the Undergraduate Learning Experience." Among its conclusions was that the university could not afford to become complacent, making minor tweaks to courses, but needed to be forward-thinking in the competencies and types of learning students would need in the future.

The university's "21st Century Curriculum" committee responded two years later with recommendations such as more problem-based, integrated first-year courses, the integration of more research experiences throughout undergraduate degree programs, more international learning opportunities, as well as ensuring access to at least one small group learning experience for first and second-year students.

Work to implement those recommendations has included reorganizing large first-year biology courses into integrated modules organized around key biological concepts, with a hands-on component, as well as changes in the College of Management and Economics, incorporating more service-learning courses.

But budget crunches have taken their toll. Faced with several unpalatable choices, Dr. Mancuso reluctantly decided she would have to suspend the university's first-year seminars in 2009, which offered interactive small-group learning experiences capped at 18 students a group.

She found a way to bring them back this year through donor funds, including the university's alumni association and a major gift from Tye Burt, vice-chair of the university's board of governors.

"We don't have a culture in Canada of looking for donors to support academic programming because of concerns of people getting too close to the curriculum," says Dr. Mancuso. But she says the curriculum was less vulnerable to outside influence because the seminars were interdisciplinary and novel, with themes determined by instructor's research interests.

As well, the university could show evidence that "these seminars make a difference," in higher GPAs for students who have taken them and enthusiastic personal testimonials from students who said the seminars gave them a chance to hone skills they could transfer to other courses.

Meanwhile, the university is leading the way in discussions among several universities over how to incorporate more "community-engaged scholarship," such as community-based service learning and research projects for students.

Included in those talks has been discussions on how to broaden tenure and promotion structures, which traditionally have valued published research as the mark of scholarship, to include other types of work such as investigating methods of teaching and learning and collaborating with community partners to solve community challenges.

"It's not sufficient to change policy," says Kerry Daly, dean of Guelph's College of Social and Applied Science and a member of the project's leadership team. "You have to change deeply embedded expectations and assumptions. That's the long, slow process."

Dr. Mancuso agrees.

"Universities are very slow to change and culture is very entrenched," she advises, "You have to be determined, focused and patient – and also continually trying to get innovation to take root."

To see a copy of the 2005 white paper, go to:
www.uoguelph.ca/vpacademic/whitepaper/lightingofafire

For more information around reward structure reform as it pertains to community-engaged scholarship, visit: http://engagedscholarship.ca

Appendix F:

Making Big Feel Small: University of Toronto's Foundation Programs

With more than 55,000 students spread over three main campuses, it might be easy for a first-year undergraduate student at the University of Toronto to get lost in the crowd.

But it's hoped that a plan to create more small-group learning opportunities for new students will help forge long-term learning and social connections that will see them through an exciting and fulfilling degree experience.

The latest example is the expansion this fall of two successful "foundation programs" that have given first-year students early exposure to an interdisciplinary program featuring small-group learning mixed with lectures and plenary sessions with guest speakers. Beginning with the "Vic One" program at the university's Victoria College in 2002, the approach expanded to Trinity College (Trin One) in 2010 and, this year, to U of T's University College (UC One).

With evidence showing students in the Vic One program garnered higher grades and had more success in subsequent years, "we've decided that we're on to a good thing," says Jill Matus, University of Toronto's vice-provost, students. Work is under way to spread the program to all of U of T's downtown campus colleges in the arts and sciences, as well as to its campuses in Scarborough and Mississauga.

Each program will "do something slightly different," depending on the character of the college says Dr. Matus. The constants, however, will be emphasis on academic skill development along with leadership, social and co-curricular opportunities that help to build a sense of community and engagement. Each college will typically offer a choice of several different thematic streams and class groups of 25 or fewer.

The UC One program, themed "Engaging Toronto" will give students the choice of four different, year-long courses looking at various aspects of the dynamics and life in Canada's biggest city, from citizenship to health and well-being. In the fall, courses will include weekly faculty presentations in conversation with guest speakers from the community, followed by a group luncheon and a discussion-based tutorial. The winter term offers small faculty-taught research seminars, as well as field trips and research projects for students to take what they've learned out into the community.

The university also continues to operate its "first-year seminar" program, tackling the same challenge of ensuring a small-group learning experience for the first-year student. These full-credit or half-credit seminars, named "199s" after their course code, focus on issues within a single, or sometimes several, disciplines, such as the history of energy, roots of Western ideas, or computers and thought.

Admitting that offering small-group experiences for all first-year students "has taken a considerable amount of institutional energy," Dr. Matus says it is nevertheless "a priority for us, to make sure our first-year students are going to have the best experience possible and that the first-year training will set them up for success in later years.

"We don't want them to be sinking or swimming."

For more information on the UC One program, visit:
www.uc.utoronto.ca/content/view/1043/2862

For more information on the Vic One program, visit:
www.vic.utoronto.ca/Future_Students/guidance/Vic_One_Program

For more information on the Trin One program, visit:
www.trinity.utoronto.ca/Prospective_Students/trinity_one

For information on the first-year seminars, go to:
www.artsci.utoronto.ca/current/undergraduate/first-year-seminars

Appendix G:

Putting Broad-based Change into Action: The Carl Weiman Science Education Initiative at the University of British Columbia

Change can be challenging, even on a small scale. But the University of British Columbia is thinking big, working to transform undergraduate science teaching in as many departments and classes as possible, through the Carl Wieman Science Education Initiative.

Under way since 2007, the $12-million project has encouraged the adoption of evidence-based teaching practice, treating the teaching of science as a scientific process in itself.
Departments are encouraged to establish what students should learn, measure what they are actually learning, adapt teaching practice and curriculum – including the use of technology and research findings – to achieve the desired learning outcomes, and disseminate and adopt those approaches that work.

Guiding the change is cognitive research that shows true expertise comes from extended mental grappling with problems rather than from attempts to insert facts into students' heads.

That's where "interactive engagement" practices come in, such as the use of clicker questions, in-class small-group discussion and problem-solving, as well as other activities. Online pre-reading assignments and quizzes, as well as pre- and post-testing help instructors to closely gauge how well students are grasping concepts and where they need help.

Four years into the project, there is now "a lot of evidence" that there is much more interactive student engagement going on in UBC science classes, even large ones with several hundred students, says Sarah Gilbert, the initiative's acting director.

There's also evidence it's working. A study published in *Science* in 2011 shows that UBC physics students doubled their engagement and learning of complex physics concepts, as well as increased their attendance, when interactive teaching approaches were used.

"The engagement drops off if the instructor starts lecturing a lot," says Dr. Gilbert about the typical pattern seen in classes using interactive teaching.

What does it take? The initiative has proceeded on the basis that pedagogical change must happen at the departmental level and has to involve the majority of faculty there. And while it should not cost more money once the change is up and running, the process of making change does require extra support and resources. The Wieman initiative works with a model of department-based science teaching and learning fellows who are expert in their discipline, and are hired by the department to work with faculty in the development of learning goals and assessing both learning and the progress of change. They are paid for out of funds provided to the department by the initiative.
So far, seven departments are involved – including statistics and math – with UBC's earth and ocean sciences department farthest along in the transformation. Some 60 per cent of faculty in that department are recognized to have fundamentally changed their teaching practice.

Named for the Nobel prize-winning physicist who first led the initiative, Dr. Wieman is currently on leave from UBC to serve as the White House's Office of Science and Technology Policy's associate director on science, under U.S. President Barack Obama.

The work he started continues, as "one of a number of big initiatives" making dramatic impacts on teaching at UBC, says Harry Hubball, the university's senior advisor on teaching and learning and director of its Institute for the Scholarship of Teaching and Learning.

That institute, for example, gets faculty seconded to it to help carry out its work. Recent initiatives include a coordinated approach to curriculum renewal and developing a scholarly and campus-wide approach to the peer review of teaching. As well, since 1998 UBC has offered a faculty certificate on teaching and learning in higher education.

And the university recently set up its own 3M National Teaching Fellows Council, capitalizing on the collective expertise of the university's 3M National Teaching award winners.

By carrying out projects that make use of the wisdom already at the university, Dr. Hubball says improving teaching practice is "not always a case of more money. It's often a case of joining the dots."

For more information on the Carl Wieman Science Education Initiative, go to: www.cwsei.ubc.ca

Appendix H:

Partnership for the Future: Laval University's Chairs in Educational Leadership Program

If all goes according to plan, Quebec City's Laval University should have at least 50 more faculty members by 2016. And each of them will be exploring new approaches to teaching undergraduates.

It's a response to what's viewed as a mutual problem for the university and the Quebec economy. The province is facing a severe skilled labour shortage. The university is challenged to find ways to produce graduates with skills suited to the economy's changing needs, as well as how to accomplish the timely hiring of extra faculty required to train students in emerging and fast-developing industries.

"What we want is a sharing of the challenge," says François Sauvé, assistant to Laval's vice-president of research and innovation.

The goal, under Laval's Chairs in Educational Leadership Program (CEL), is to create 10 chairs a year for the next five years and each position generally lasting for an initial five-year term. It is expected five chairs will already be in place for September 2011. What makes the program special is that Laval is turning to the private sector and other potential external funding partners with a stake in Quebec's economic future, such as government and non-governmental agencies, for $20 million towards the program cost. The university will contribute $15 million out of its existing budget.

But it's not just a question of adding teaching bodies, says Mr. Sauvé. What the university wants is to discover and adapt to new ways of educating students that fit with how they learn today as well as the realities they will face after graduation. Student success will be the main focus. Potential chair holders will be selected on a record of teaching excellence and will be asked to propose research projects looking into novel teaching practices. It is expected they will eventually transfer what is learned to other areas in the university. External partners will be asked to commit to covering half of a chair's salary for five years, as well as contributing at least $15,000 annually towards the chair's teaching research.

"Is formal classroom teaching still necessary? Do we need to evolve that model?" says Mr. Sauvé, adding that more distance learning or workplace opportunities and even reflecting on the role of the teacher could be considered. "We need to get some of those chairs in educational leadership to explore that."

Chairs will be appointed in a broad range of disciplines – mining, information technology, and health sciences have already been identified as having an interest in the program.

The program is an offshoot of Laval's successful Research Advancement in Research, Innovation and Education program (PAIRE), which has raised more than $100 million in just two years to fund 100 research chairs in key knowledge industries.

Instead of having to wait for student numbers to rise in a particular area in order to hire more faculty, CELs will allow Laval to be pro-active and build programs that will eventually attract more students into them.

"It's going to provide us with some leverage to answer the emerging market needs," says Sauvé. "It's a work in progress."