



To: Faculty Council

From: Professor Doug Reeve, Chair, Dean’s Task Force on Engineering Leadership Education

Date: May 3, 2010

Item: Proposal to Establish an Institute for Leadership Education in Engineering in the Faculty of Applied Science and Engineering at the University of Toronto as an Extra-departmental Unit C (EDU:C)

1. Overview

Dean Cristina Amon established the Task Force on Engineering Leadership Education in the Faculty of Applied Science and Engineering in October 2009. Members of the Task Force included: Professors Doug Reeve (Chair), Phil Byer, and Bryan Karney; Leadership Development Professor David Colcleugh; Engineering Science Lecturer, Lisa Romkey; Engineering Leaders of Tomorrow Coordinator, Annie Simpson; Co-President of Engineers without Borders (Canada), George Roter; UofT Student Life Programs manager, Ian Simmie; graduate students, Maygan McGuire and Angela Tran; and undergraduate students, Shahed Al-Haque and Chris Langan. The Task Force was to review the advances made by the Engineering Leaders of Tomorrow (LOT) program (founded in Chemical Engineering in 2002 and expanded to Faculty-wide in 2006) and develop strategies for the future.

The Task Force recommends the creation of the “Institute for Leadership Education in Engineering” (ILead). It is proposed that the Institute be formed and organized as an EDU:C type of extra-departmental unit within the Faculty of Applied Science and Engineering. This proposal describes the key elements of the proposed Institute, its scholarly domain, structure, resources, and future measures of success. The Institute vision statement proposed is: “Engineers leading change to build a better world”. The Institute will be the first of its kind in the Canadian engineering landscape offering curricular, co-curricular and extra-curricular leadership education, and will position University of Toronto Engineering to lead the way in empowering engineering students to succeed as leaders in their profession and beyond.

2. Key Elements of the Institute for Leadership Education in Engineering

2.1 Background and Motivation

There is a need to prepare engineering students to address increasingly complex global challenges. Engineering students have tremendous potential, and given opportunities to develop themselves as leaders, that potential will be increased. The world needs engineers who can balance the ambitions of their organizations with the limits of the planet, engineers who can

mobilize others towards a common good, and engineers who can communicate their technical knowledge in ways that empower others. It is evident that engineers are under-represented in the top leadership posts in politics and the corporate and social sectors. As demonstrated at MIT, Penn State, Tufts and other prestigious American engineering schools, there is a movement to deliver leadership education that empowers engineers to fulfill their goals and have greater impact in the world.

The University of Toronto Engineering Leaders of Tomorrow (LOT) program was the first of its kind in Canada. LOT has successfully engaged students from across all the undergraduate and graduate Engineering programs through curricular courses, co-curricular certificate programs and extensive extra-curricular offerings. LOT began in 2002 in the Department of Chemical Engineering and Applied Chemistry. In 2005-06 there were 39 events in Chemical Engineering and just over 800 student contacts. In 2006 funding was granted by the Provostial Academic Initiative Fund (AIF) and the program was expanded to be offered Faculty-wide. The program has grown tremendously since; in 2008-09, participation reached 8400 student contacts at 199 events. It is worthy of note that LOT has been praised by alumni and generously supported by alumni donors who have committed over \$2 million towards LOT scholarships, awards, and programming. Now that LOT has been in operation for eight years in Chemical Engineering and four years across the Faculty, the next stage in engineering leadership education at UofT will provide an opportunity to reach more students and have deeper impact.

2.2 Academic Mission

The academic mission of ILead is to be at the leading edge of pedagogy for engineering leadership education, in development of theory and in execution of programming. ILead will undertake research and scholarly creation of new knowledge, participate in scholarly publications and fora, and continuously evaluate progress in leadership development programming at the levels of individual, workshop, course, and program.

Leadership learning begins with individuals coming to know themselves, their values, their strengths and weaknesses, their talents and their passions. Self-knowledge increases personal capability, which is further enhanced through the creation of a personal vision of the future, growth in emotional intelligence, and the ability to make decisions that are congruent with personal values. The second level of development involves relational leadership where students grow as collaborators and team members, learn how to communicate effectively, resolve conflict and become astute in team dynamics. This level of skill empowers students to inspire others and to build strong teams and groups. The third level of development is organizational leadership, which manifests itself in organizations of all types, including businesses, institutions, governmental and non-governmental entities. This level of leadership includes creating organizational vision, setting direction, embracing ambiguity, reconciling organizational aspirations and constraints, and empowering others. The last level of development, societal leadership, involves creating change beyond the organization. Leading in society requires understanding the issues of the day and acting as citizens and catalysts of change. Individuals who participate in political change, contribute to social movements and deeply engage other citizens demonstrate societal leadership. Programming at these four levels (Self, Relational, Organizational and Societal Leadership) will enhance engineering education and empower our graduates to make greater contributions.

Teaching leadership has special challenges. Some would argue that it cannot be taught, that it must be learned, through experience, and they are not wholly wrong. It cannot be taught by lecture alone; it requires a number of different strategies to engage students in a number of ways: intellectual, social, psychological, and emotional, and with a number of formats, such as: experiential workshops, design laboratories, team projects, field excursions, mentoring, coaching, guided reflection, service learning, discussion tutorials, and visioning exercises. Paraphrasing experts in the field, the learning process is a cycle consisting of conceptualization/abstraction moving to active experimentation moving to concrete experience moving to reflective observation and completing the cycle by moving back to conceptualization; the student starts the process at any point in the cycle.

LOT programming to date has provided three levels of engagement. Basic-level programming seeks to provide all engineering students with an appreciation of the value and nature of leadership. Mid-level programming offers students opportunities to learn, develop and then exercise newfound skills. Highly engaged students can pursue their leadership development at an enhanced level. Leadership infusion lectures, special lectures and events, and skill development workshops are available to, and intended to reach, all undergraduate students. At the mid-level of engagement, co-curricular certificate programs are offered. Two of these take place during the academic year and involve five, two-hour skill development workshops: Certificate 1 -Team Skills, and Certificate 2 - Self-Leadership: Leading from the Inside Out. The curriculum for both certificates is highly experiential. Assessment and feedback has shown a high degree of growth in student learning. For students wishing to engage at the enhanced level, LOT offers three academic courses: APS 501 - Leadership and Leading in Groups and Organizations, APS 1010 - The Cognitive and Psychological Foundations of Leadership, and APS 1011 - Concepts and Applications of Authentic Leadership. Feedback from students who have taken these courses has been exceedingly positive and student demand has been greater than we have been able to accommodate. Co-curricular and extra-curricular leadership development activities will continue to be led by LOT operating under the umbrella of the Institute.

2.3 Benefits of the Institute

Leadership development activity in engineering schools elsewhere and in the Faculty is surging ahead, propelled by student interest, societal need and the recognition that the engineering profession can, and should, play a greater role in the many challenges confronting society. An institutional structure will support and encourage continued rapid growth. The function of the Institute is threefold: teaching, research and outreach in the domain of engineering leadership development. The Institute will facilitate research and scholarly work on leadership pedagogy and engage with others around the world doing this kind of work. The formation of an institute will put UofT Engineering's effort on a similar footing with other similar units abroad, particularly in the United States. There is much to be done in presenting the concepts and the opportunities of engineering leadership education to alumni, to the profession more broadly and to engineering schools across the country and the formation of an institute will support this. UofT Engineering is first in Canada in this field and has much to contribute. The Institute can do much to demonstrate the tremendous value of empowering technical competence with leadership competence. The Institute presents an outstanding opportunity to link with alumni and with industry. It is expected that donor prospects, having been successful leaders themselves, will find the ILead mission very attractive.

2.4 Alignment of the ILead with Top Level UofT Planning Priorities

ILead is aligned with key elements of the University's September 2009 "Towards 2030" academic planning document. ILead will directly promote the growth, development and experience of students participating in the leadership education activities, according to the plan: *Focusing on providing an excellent experience for students, inside and outside our classrooms*. Through a three-pronged approach (curricular, co-curricular, extra-curricular), ILead will provide an excellent, integrated educational experience and empower engineering students to contribute at a higher level. This leads directly to another of the missions of the plan: *Contributing substantially to the prosperity of the Toronto region, Ontario and Canada*. The vision statement of ILead – "engineers leading change to build a better world" – speaks directly to engineers having greater impact, contributing to increased prosperity. ILead will provide educational opportunities that deliver on another mission of the plan: *nurturing inquiring minds and building the creative and analytical capacity of our students at all levels*. ILead seeks to increase the capacity of our students' technical competency by the addition of leadership competency. The plan speaks of *enrolment and recruitment strategies, and maintaining our leadership position in graduate and secondary professional education*; ILead will enhance recruitment of top-level, highly motivated students at both the undergraduate and the graduate level. LOT already contributes to the professional education of graduate students in the research stream and through the Faculty's MEng ELITE program. As Canada's first institution for comprehensive engineering leadership education, ILead is on the way to achieving another of the 2030 goals: *Enhancing our global reputation for the generation of new ideas*.

3. Structure of the Institute

3.1 EDU:C Status and Faculty Complement

It is proposed that ILead be established as an EDU:C type of extra-departmental unit. As an EDU:C, ILead will not be authorized to make primary teaching appointments, but may hold cross-appointed status-only faculty.

3.2 Academic Programs

As an EDU:C, ILead may offer a set of courses in an academic area, in this case engineering leadership education. The courses will be elective courses, department or Faculty sponsored, for example those offered already: APS 501, APS 1010 and APS 1011. Students will register, for information, with the ILead program coordinator.

3.3 Administrative Structure

It is proposed that ILead be established with its own administrative budget and the authority to administer research and scholarly grants, and to serve as the administrative home for such research and scholarly projects in appropriate areas by ILead members.

As the leader of the EDU:C, the ILead Director will be appointed for a fixed term by the Dean of the Faculty of Applied Science and Engineering. The Director will report administratively to the Dean. The Dean will undertake reviews at intervals corresponding to the appointment or re-appointment of a Director. Reviews will be based on benchmarks for success as described in Section 5.

4. Benchmarks and Measures of Success

The success of the Institute will be measured by its ability to engage faculty and students, its ability to enhance the Faculty's educational offerings and the impact of the Faculty's teaching and scholarly activity, and on the visibility it brings to the Faculty. Specific measures of these achievements might include:

- National and international recognition as a leading educational and scholarly entity in the field of engineering leadership education; seen as mounting innovative programs and initiatives
- Undergraduate and graduate student participation in courses and programs offered by ILead
- Enhanced opportunities for student leadership development experiences
- The quality of student knowledge and understanding of leadership and of student leadership capability
- The quality of student feedback on event and course evaluations
- The number of faculty partners ILead attracts
- ILead members' ability to attract funding and produce scholarly output
- Number and quality of partnerships ILead develops with organizations/units internal and external to the University of Toronto

Recommendation and Motion for Faculty Council:

THAT the Faculty establishes an Institute for Leadership Education in Engineering:

- a) with the mandate to provide and facilitate curricular, co-curricular and extra-curricular leadership development programming
- b) to engage in research and scholarly work on engineering leadership education
- c) that incorporates the ongoing functions of Engineering Leaders of Tomorrow (LOT)
- d) to be an Extra-Departmental Unit – C (EDU-C)