

Troost Institute for Leadership Education in Engineering (Troost ILead)

University of Toronto

Emily Moore, Cindy Rottmann and Patricia Sheridan

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Abstract

The University of Toronto's Troost ILead supports the leadership development of all engineering students through curricular integration, co-curricular programming and graduate student research.

Program Description

Troost ILead began in 2002 as Leaders of Tomorrow (LOT) in response to feedback from industry that graduating students were technically excellent but needed more development in relational skills. The co-curricular program was launched for undergraduate chemical engineering students and proved immensely popular. LOT grew based on the entrepreneurial energy of founding Director Doug Reeve and Associate Director Greg Evans who secured a significant university grant in 2007 that enabled them to hire staff to take the LOT program faculty wide.

With the success of LOT, Doug Reeve worked to establish the three-year Engineering Leadership Project by securing four industrial partners to sponsor research into engineering leadership. These industrial donations led to the creation of ILead as a recognized teaching and research institute in 2011. Over the following years, the Engineering Leadership Community of Practice (COP) was established and further decanal and industrial support garnered. Relationships were cultivated with the first-year programs and other departments to build curricular integration on team skills into design and project-based courses. In 2018, three professors were hired (Sheridan, Olechowski, and Moore). Following a significant donation from a board member, alumnus, and advocate in 2018, we were renamed Troost ILead.

Research is a key part of the mission and a differentiator for the institute. The Engineering Leadership COP, consisting of industrial partners, is a key supporter of the research and teaching program and a vehicle for outreach to the profession. Working closely with the COP, the Troost ILead research team studies leadership development in classroom and industry contexts. Key

themes over the years have included engineering leadership in professional practice [1], team effectiveness [2], ethics and equity in engineering education and practice [3], and engineering career paths [4]. Graduate students continue to do research in these and related areas, as well as undergraduate summer and thesis students.

Today, Troost ILead continues its vision of “Engineers leading change to build a better world.” We offer elective courses on leadership at both the graduate and undergraduate level, provide curricular integration into over 20 courses across the Faculty and oversee a robust co-curricular program [5]. Every engineering undergraduate student at UofT is exposed to leadership content through curricular integration into the first-year design program. More than 1000 students a year take our elective courses, and 250 a year participate in our co-curricular programs. Our curricular integration focuses on building team skills through instruction and workshop activities as well as delivering guest lectures on other aspects of leadership such as career paths and equity. Our 17 elective courses cover leadership through dedicated courses on positive psychology, leadership storytelling, ethics and equity, and team and organizational leadership. Finally, our co-curricular programs invite students to explore particular topics in drop-in workshops offered throughout the year. Our most extensive program is our Summer Fellowship which offers a series of workshops to club-leaders to help them lead change projects for their clubs.

Connecting Themes

Troost ILead uses a process-based definition of leadership: leadership is a process of influencing others for positive change [6]. The student program was heavily influenced by Komives et. al.’s (2006) student Leadership Identity Model [7] and focuses on self-awareness and the practice of leadership as a relational process. Recent work has expanded to include theories of change and systems thinking in our program [8].

Instructional Strategies and Teamwork

ILead’s philosophy is that everyone can be a leader. Our teaching and co-curricular programming help students identify their own leadership philosophy based on their unique values, motivations, and preferred working styles. Our instructional approach emphasizes experiential learning, psychological safety, self-reflection, and team projects. Sample courses include The Happy Engineer, which draws from positive psychology to help students better understand themselves, Engineering Leadership which explores how engineers work in teams and organizations to build individual leadership philosophies, and The Power of Story, in which students develop their own leadership narratives.

Given the developmental stage of our students, teamwork is the primary focus of ILead’s course integration program [9]. The emphasis in our teaching is less on the project management skills

needed to lead a team, and more on developing the relational skills for a team to work well together. Students start with an understanding of who they are and what they bring in terms of strengths, styles and values, and instruction is given on how to work with others who may be similar or different to them. Coaching on peer feedback and conflict resolution through classroom exercises, TA training, and team support clinics, supplement formalized curricular instruction. Effective Hybrid Teaming [10] is a resource for students that is a great summary of strategies, including for psychological safety, inclusive teams and effective use of team charters.

Equity, Diversity, and Inclusion (EDI)

Equity, Diversity and Inclusion (EDI) considerations infuse everything we do at ILead, from our philosophy that every student can be a leader [6], to our curricular integration of ethics and equity case studies [3], and our research conducted through an intersectional lens foregrounding gender and race [11][12]. Equitable access to leadership development opportunities is a major focus of our programming, research and outreach, and is regularly integrated into our teaching.

Our Impact

The integrated and universal nature of our program makes it challenging to conduct meaningful program evaluation, independent of other curricular and co-curricular opportunities experienced by engineering students at UofT, but a recent alumni survey suggests that graduates who engaged in multiple ways with ILead programs (i.e. took an elective course and participated in co-curricular activities) got the most out of their experiences [13]. When it comes to formative feedback, each elective course and program has surveys for immediate feedback that inform continuous development. The research program also includes studies of interventions and courses (for example [2][8][9]).

Next Steps

As ILead has continued to grow and mature, within the context of a new engineering education department (The Institute for Studies in Transdisciplinary Engineering Education and Practice—ISTEP), we have expanded our graduate and professional programs collaborating with colleagues who specialize in communication, business and entrepreneurship, lifelong learning, and socio-technical thinking. This institutionalization process has allowed us to increase our faculty complement, extend the reach of our programming staff, support graduate student research training, and enhance our competitiveness with respect to research grants. Future areas of research and programming include: collaborative design communication, systems thinking for sustainability, continued work in student and professional teams, and collaborations with other STEM professions.

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