What can we learn from Case Studies of Engineering Leadership programing across Canada?

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The case study method has been used for more than a century in professional educational settings such as law, medicine, business, and engineering to prepare students for professional practice (Agle et al., 2016; Bertha, 2010; Loendorf, 2009; Martin et al., 2021; Rottmann, 2021). In contrast to problem sets with defined answers or design projects with defined processes, case studies help learners imagine and navigate the more ambiguous elements of their work. They enable students to study social and technical issues in organizational contexts, giving them a feel for professional practice prior to graduation.

In the social sciences, case studies are not only useful pedagogical tools, but also a methodological approach used by researchers to study a phenomenon in context (Bassey, 2003; Merriam, 1998; Stake, 1995, 2003; Yin, 1993; Yin, 2014). According to Yin (2014), case studies "investigate a contemporary phenomenon in its real-world context, especially when the boundaries between phenomenon and context are not clearly evident" (p.2). Engineering leadership in Canada is a phenomenon that cannot be separated from the many contexts in which it takes root. There is no singular "best practice" of leadership learning that can be deposited into another educational setting without adapting to the strategic priorities, policies, practices, and culture of the institution. Rather, what we see when we speak to our colleagues is a wide range of leadership development initiatives, courses, programs, and clubs that have been attempted, formalized, and optimized in engineering faculties with distinct organizational cultures, industry partnerships, and levels of administrative support. This book uses the term "case study "in both senses, as a pedagogical tool and as a methodology for investigating engineering leadership development in context.

As an emerging body of research and practice, engineering leadership (EL) case studies have a great deal to teach us about formal and informal change in higher education. First, since leadership development remains peripheral to the core engineering curriculum and to our national accreditation board (CEAB, 2021), EL case studies teach us how engineering educators have institutionalized curricular and co-curricular change from the bottom up. Second, in a more tacit way, they teach us who cared enough to plant the seed of leadership development in each institutional context, what supports were necessary to keep them going, which curricular and co-

curricular spaces were most amenable to EL education, which pedagogical strategies have supported students' leadership development, and what impact these initiatives have had on students, faculty, staff, and the profession. That is, in the absence of a centralized leadership development mandate or accreditation drive, this collection of EL case studies makes an important contribution to the larger body of literature on higher education reform in Canada—one champion, one classroom, one co-curricular program, and one institute at a time.

While this kind of work has been done in the United States (Donald & Jamieson, 2022; Kendall & Rottmann, 2022; Klassen et al., 2020; Klassen et al., 2016), we have become increasingly aware that leadership programing looks different across Canadian faculties of engineering and cannot be adequately represented through a single case study. The current collection of case studies allows us to shift from the periphery of a North American text to the centre of our own text, mapping out the state of engineering leadership education in Canada as a professional formation process in its own right with national, regional, and institutional flavours. The case studies in this book help us understand the phenomenon of engineering leadership across regional and institutional contexts; how they have taken root, flourished, floundered, and changed over time. The key features of these initiatives have been shared as oral narratives, lunchtime discussions, zoom chats, and conference papers in three related networks (CEEA/ACEG SELM, NICKEL, ASEE-LEAD), and are now ready to be documented and analyzed as a living library of Canadian engineering leadership change projects.

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