The Power of Leadership in Engineering Management Education

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EXECUTIVE SUMMARY

The aim of this chapter is to bridge the gap between literature about leadership studies and engineering education to develop future engineering leaders. The chapter focuses upon the hindrances that are faced in integrating leadership programs in the engineering circular. To this end, the chapter employed qualitative methodology under which it reviewed literature on multiple lines such as identifying significance of leadership for engineering students, identification of leadership practices and skills taught to engineering students, and the way this can be improved. Key findings of chapter emphasized on leadership as an important skill for future engineers thus demanding need for equipping engineers with skills needed to become an effective leader. It is found that having engineers to develop leadership skills will enable them to perform their role effectively, effectively allocate and utilize available resources. Thus, the chapter recommends integration of leadership knowledge and skills in engineering curricula through usage of variety of tools such as experiential learning and self-awareness.

INTRODUCTION

Global recognition of the "leadership" concept that has emerged over the past several years has resulted in certain challenges for various contexts in altered settings. Debates about different leadership styles and the suitability of specific approaches in various situations have been highlighted (Vroom & Jago, 2007; Bennis & Nanus, 1985). While it is evident that leadership studies have been growing significantly in many fields such as politics, organizations, health, engineering and even education (Esen, Bellibas, & Gumus, 2018), there are still a lack of consensus on the definition of leadership. While academics define leadership with adjectives and verbs (e.g. visionary, creative and empower) (Cox, Berry, & Smith, 2009), industry experts link leadership to action-oriented elements (e.g. being proactive and having good decision making skills) (Cox, Cekic, Ahn, & Zhu, 2012).

In the corporate world, engineers are frequently overlooked for leadership positions while individuals with MBAs and similar degrees are given a preference as they are better equipped with communication, leadership and management skills (Summers, Davis, & Tomovic, 2004). Several companies now demand for engineers to possess analytical and leadership skills for promotions and leadership positions (Kumar & Hsiao, 2007).

Leadership skills for engineers are important as they ensure that engineers are not only equipped with the technical knowledge but are also innovators and responsible citizens of the society, bringing about positive change. More precisely, construction companies are especially recruiting graduates with both management and leadership skills to be able to improve interpersonal skills and successfully fulfil projects (Dulaimi, 2005). According to Arciszewski (2006), lack of leadership in civil engineering was a crisis and the engineers were urged to use current challenges to evolve the profession to cater to the everchanging demands.

Understanding the wide ranging individual and organizational benefits of leadership skills, Accreditation Board for Engineering and Technology (ABET), National Academy of Engineering (NAE) and similar organizations have stressed upon a formal inclusion of leadership programs in the engineering curriculum and have associated leadership with successful recruitment and career progression (Kumar & Hsiao, 2007). Similarly, numerous undergraduate and graduate engineering programs have initiated leadership development as either part of the curricula, as a co-curricular or as an extracurricular activity.

One such example is of the Engineering Leadership Program (ELP) based on the "Engineer of 2020" vision articulated by the National Academy of Engineering in the Iowa State University. It is a 4-year program that develops leadership within the students through meaningful co-curricular activities in addition to their classroom experience (Athreya & Kalkhoff, 2010).