

Responding to Administrative Priorities

Developing Engineering Leaders: The Role of Emotional Intelligence in the Development of Soft Skills

Capsule: It's well-established that development of technical knowledge, skills, and abilities (KSAs) is only part of the curriculum for the education of the "well-rounded" engineer; the development of "[soft skills](#)" is also essential. Research indicates that a person's level of emotional intelligence is the most effective predictor of his/her success as a leader, suggesting that emotional maturity enables competence in soft skills.

Summary: The key attributes of engineers, enumerated in Hissey (2000) and later in the National Academy of Engineering's landmark report [The Engineer of 2020: Visions of Engineering in the New Century](#), include both technically oriented competencies and traits (e.g., strong analytical skills and practical ingenuity) and personality-based skills (e.g., creativity, communication, and leadership). Yet, Riley, Horman, and Messner (2008) note that, at least with respect to undergraduates in construction engineering, students tend to lack the interpersonal skills necessary to success as a project manager, a leadership position many will be expected to fill. The authors cite studies linking the level of emotional intelligence as the most effective predictor of success as a leader, and describe the design, implementation, and validation of ABET-appropriate courses to develop needed competencies and traits. The implication is that the ability to employ soft skills successfully is partially dependent on a person's level of emotional intelligence.

The concept of emotional intelligence was popularized by [Daniel Goleman](#), a social psychologist. His base definition, quoted in Barry and du Plessis (2007), is "a capacity for recognising our own and others' feelings, for motivating ourselves, and for managing our emotions, both within ourselves and in our relationships." In an adaptation of the construct for project managers, Barry and du Plessis identify two main clusters, self and social, which are further divided by recognition and regulation. The resulting construct thus has four dimensions: self awareness, social awareness, self management, and relationship management. They identify relevant KSAs in each dimension, and validate their construct and selected KSAs through a survey of 395 practicing project managers and project management students primarily located in South Africa to identify the KSAs important to professional success.

Implications for Engineering Education: The consensus in the literature is that an awareness of emotional intelligence and its applications can be developed through instruction. Therefore, administrators committed to a holistic concept of engineering education may want to consider ensuring that appropriate courses addressing both the development of emotional intelligence and the acquisition of soft skills are included in the curriculum. It seems equally desirable to offer both discipline-specific and interdisciplinary opportunities for learning, such as classes, internships, and co-ops, to help students learn how to operate in the various team environments they may encounter in the workplace. A requirement that all students take, at a minimum, a survey course in soft skills also seems to be indicated in order to meet the visions of the referenced reports. While not everyone has the desire or personality for management, it's important to be aware of the requirements and responsibilities of leadership in order to support those in such positions as best as possible. A related report is Donohue (2008), which discusses research on the relationship between emotional intelligence and self-efficacy in undergraduate computing majors with the goal of developing a predictive model of academic success.

References: Marie-Louise Barry and Yvonne du Plessis (2007). "Emotional Intelligence: A Crucial Human Resource Management Ability for Engineering Project Managers in the 21st Century." In the *Proceedings* of AFRICON 2007.

Susan K. Donohue (2008). DEEP #8 *Developing a Predictive Model of Academic Success Using Emotional Intelligence and Self-Efficacy*, Research into Practice Series, Center for the Advancement of Scholarship on Engineering Education, National Academy of Engineering. Available at [CASEEconduit](#).

T.W. (Ted) Hissey (2000). "Education and Careers 2000: Enhanced Skills for Engineers." In the *Proceedings of the IEEE*, 88(8), August 2000, pp. 1367 – 1370.

David R. Riley, Michael J. Horman, and John I. Messner (2008). "Embedding Leadership Development in Construction Engineering and Management Education," In the *Journal of Professional Issues in Engineering Education and Practice* 134(2), April 2008, pp. 143 – 151.

Prepared by: Susan K. Donohue, Ph.D., EEES Postdoctoral Engineering Education Researcher, Center for the Advancement of Scholarship on Engineering Education, November 2008.