

Work in Progress - Engineering Leadership Program: A Thematic Learning Community

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Abstract - The Engineering Leadership Program, which began at Iowa State University in 2006 as a four year pilot leadership development program for undergraduate engineering students, is now working on mainstreaming the program. It has evolved into a student-led co-curricular leadership learning community with a strong focus on service and community, and is serving as a model for other holistic-themed learning communities in the college. A new scholars program in the college based on the Engineer of 2020 has four learning pillars, including leadership, and was created using the Engineering Leadership Program as a model. Planning is underway on strategies to mainstream best practices from the pilot and the optimal channels to deliver them. The learning outcomes assessment of the program is a work in progress. The first cohort entered in 2006 and graduates in 2010, and their early career accomplishments will be one indicator of longer term program impact.

Index Terms – Leadership, Learning community

INTRODUCTION

The Engineering Leadership Program (ELP) at Iowa State University began as a four year pilot in 2006 with initial funding from the 3M Foundation to inspire engineering students to develop as leaders in the private and public sectors aligned with the Engineer of 2020 attributes articulated by the National Academy of Engineering [1]-[3]. Students were recruited to the pilot program through an application and review process, and were offered four years of scholarship support contingent on full participation. The program elements were created, modified and implemented through faculty, staff, and student collaboration. Program development was also informed by a leadership model having competency-based learning outcomes, including selected outcomes from ABET Criterion 3 [4]. As ELP evolved, there were collaborations and discussions with other engineering leadership programs such as the Gordon Leadership Program at MIT, the Engineering Leadership Development minor at Penn State University, and Central Florida's Center for Engineering Leadership and Learning [5]-[7]. On the Iowa State campus, ELP is now recognized as a new type of multi-year learning community in the

college, one that engages students, freshman through senior, based on shared values and learning outcomes.

PROGRAM OVERVIEW

The program is designed around a cohort model. Since its inception in 2006, ELP has brought in a new cohort of scholars each year, and the current strength of the program stands around 85 scholars. The program includes students from every engineering major in the college. Over the years, the percentage of female scholars has ranged from 45% - 50%. The four year program provides incremental steps for scholars to understand and practice leadership skills via a variety of curricular and co-curricular activities personalized to the interests of the scholar.

The ELP activities are based on learning outcomes of a locally developed competency-based leadership model closely aligned with ABET outcomes [7]-[8]. There are eight learning outcomes that describe the knowledge and skills that will be achieved by an ELP scholar through participation in the program. Five of the outcomes are from ABET Criterion 3 and apply to all engineering students. Three of the outcomes are specific to ELP and reflect the additional skills that students should attain as part of this program. These additional learning outcomes include an ability to create a vision, an ability to innovate, and an ability to value diversity and create an inclusive environment. To support the learning outcomes, ELP has identified nineteen competencies and specific key actions for each competency. These competencies are realized through the various program features and activities.

A first year of structured activities includes a credit bearing seminar class to introduce scholars to the basics of leadership, a service learning project, common readings, community-building retreat, peer and faculty mentoring, and professional networking opportunities. Following this, scholars then pursue a more flexible and personalized leadership development pathway. Each scholar works to create a vision and self-directed development plan through projects, book groups, and seminars. The program builds on and adds value to academic and student organization experiences of scholars by facilitating complementary development in the area of leadership. A leadership advisor/mentor plays a significant role in coaching and tracking scholar development after their first year through individual meetings and follow-up communications.

A weekly newsletter keeps the entire community informed about program developments as well as opportunities. Every scholar maintains an electronic portfolio, and each semester they identify two to three competencies to focus on, set goals, and identify key activities to engage in. The scholars track their leadership development each semester by reflecting on their leadership engagements and by providing supporting artifacts [9]. They also propose and implement a multi-year leadership learning project. ELP scholars respond to a formal request for proposal. The plan for the project should push them to expand their knowledge, skills, and abilities. Each proposal is reviewed by a team of students, faculty, and alumni/corporate friends. Every scholar designs a project based on individual interests and leadership learning goals and having social and community impact. A leadership learning project is expected to encourage self-awareness and independent thinking among scholars. It provides active, project-based learning. Scholars learn about the process of creating a vision as well as a plan of action. Through these projects the scholars are empowered to take risks in a relatively safe environment. They are coached to reflect on their setbacks and failures and to adapt to change.

The program has resulted in high student engagement in leadership development in the college [10]. Scholars have assumed leadership roles as part of the program team, and this has been integral to program development and implementation. This student empowerment approach to program development, with faculty and staff acting as facilitators, has been a unique feature of ELP. A team of ELP scholars and faculty is currently working on assessment methods to evaluate scholar development through various program features. The first full ELP cohort is graduating in 2010, and their level of professional leadership and civic and corporate engagement will be the ultimate indicator of longer term program impact.

LEARNING COMMUNITY ENGAGEMENT

Iowa State University has a strong tradition of learning communities, annually rated among the top 25 colleges and universities for learning communities by *U.S. News and World Report*. ELP was formally included in Iowa State's roster of learning communities in 2009-2010 and received a small grant for community building through an internal grant competition [11]. Student participation in learning communities contributes positively to student success and retention. Nearly 85% of first-year engineering students belong to learning communities, including ELP. The National Survey of Student Engagement (NSSE) provides benchmarks of the student experience that contribute to student success and retention. A comparison of the NSSE student survey results from 2007 to 2009 for engineering students sampled at Iowa State shows increased ratings for benchmarks over that period.

Based on ELP, a new learning community called E2020, supported by the National Science Foundation Scholarships in STEM Program, is in its first year [12]. The effective

collaboration between ELP and E2020 is resulting in greater faculty engagement on curriculum and learning outcomes.

PROGRAM EVALUATION AND OUTCOMES ASSESSMENT

Program effectiveness is measured through survey and focus group feedback from scholars. Individual growth and development are tracked through an online portfolio system that is also used by some departments within the college in the curricular setting. Students specify their semester leadership development goals using the portfolio system and leadership competencies. The portfolio system is a tool for scholars, faculty and staff to keep an on-going record of development over time within the program.

FUTURE OUTLOOK

The broader thematic approach to these newer learning communities in engineering is expected to be transformational in enhancing student engagement and a sense of community that cuts across strict disciplinary boundaries. The high percentage of women involved in these communities reinforces the broader attraction of the social context of engineering, and this in turn may inform diversity efforts in the college.

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