

Work In Progress - Engineering Leadership Program: Tracking Leadership Development of Students using Personalized Portfolios

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Abstract - The Engineering Leadership Program was started at Iowa State University in 2006 to inspire altruistic leadership in engineering students. The program uses a cohort model to promote leadership development of students who pursue co-curricular and innovative curricular opportunities throughout the undergraduate years, starting from the first year. A collaboratively crafted competency based leadership learning model is the framework for Engineering Leadership Program activities and assessment. Students within the program are using a locally designed electronic portfolio system to track their progression, using the leadership model competencies to guide their leadership development. The tracking of competency development for individual scholars through the personal portfolio system will be presented.

Index terms – Leadership model, leadership competencies, personalized portfolios

INTRODUCTION

The College of Engineering at Iowa State University established its Engineering Leadership Program (ELP) with initial funding from 3M in 2006 to develop engineers with the characteristics outlined in the *Engineer of 2020* by the National Academy of Engineering [1,2,3].

The program goal is to develop future leaders who are active in public life making social contributions above and beyond traditional engineering roles [2].

PROGRAM OVERVIEW

The ELP is currently entering its third year since the recruitment of the first scholar cohort in Fall 2006. The scholars provide the central administrative leadership for program design and implementation.

The first year experience has emerged as a well-structured common learning experience for the incoming cohort. Elements of the first year experience include a community building retreat for affirmation of leadership values, a common reading project, a required weekly credit

bearing seminar class, weekly reflections journal, a service learning project, and numerous networking opportunities.

During the first year of the program, a competency based leadership model was crafted through an iterative collaborative process including students, college and university staff, and faculty [4]. Learning outcome statements were articulated in a language akin to ABET [5], and nineteen competencies were mapped to those outcomes, with examples of key actions to support each competency.

Beyond the first year, scholars progress to a more flexible and personalized leadership development model. The second year cohort elected to meet in weekly seminars related to common readings selected by scholars. A new group of upper class scholars joined the second year scholar cohort through a competitive selection process. A retreat built around a set of competencies in the leadership model helped the scholars begin the community inclusion process with the newcomers. At the end of the first semester, upper class scholars prepared proposals for long term leadership learning projects that would be sustained beyond their graduation and have significant societal impact.

A requirement for scholars beyond the structured first year activities is the articulation of personal leadership goals and tracking their activities and experiences that connect to the leadership competencies using an electronic portfolio system.

LEADERSHIP COMPETENCIES AND THE ELECTRONIC PORTFOLIO SYSTEM

The ELP Leadership Model identifies four broad categories into which nineteen leadership competencies are grouped.

- *Leadership Characteristics*: initiative, integrity, analysis and judgment, communication, energy and drive
- *Engaging Others*: building a successful team, developing others, coaching, teamwork, leading through vision and values
- *Awareness and Growth*: engineering knowledge, general knowledge, cultural adaptability, continuous learning

- *Demonstrating Excellence*: quality orientation, customer focus, innovation, professional impact, planning

Many engineering educators are taking the portfolio approach towards professional development competency based learning that complements the traditional engineering curriculum [6]. The ELP is following that approach and is encouraging scholars to individualize their leadership development throughout their time in the program by focusing on specific leadership model competencies of their choice.

The program focuses on allowing scholars to individualize their leadership development to tailor to their interests and develop in competencies of their choice within the leadership model. With this flexibility in the program, it becomes important to have a consistent way for tracking scholar development, evaluating program effectiveness and supporting scholars with their leadership learning. The ELP is piloting a locally created electronic portfolio system, E-Doc, for this purpose. The E-Doc portfolio system is also being used by a few other departments and colleges at Iowa State University including the Agricultural and Bio-Systems Engineering (ABE) department.

The original E-Doc portfolio system was designed by a team of on-campus educational software designers for clients at Iowa State University. ELP scholars are working with one of the team leaders to tailor the E-doc portfolio template to incorporate the ELP leadership model and accommodate scholar needs. Throughout this iterative creation process, scholars provided feedback to help eliminate confusion and create a user-friendly system.

The current system being piloted allows scholars to create their individual customized portfolios by creating their own menus and sub menus, posting documents, setting goals, and writing reflections. The portfolios also allow scholars to link their documents to leadership model competencies in addition to setting goals and posting reflections on the competencies. These capabilities help scholars store documents from leadership learning activities, reflect on their leadership learning, and plan their future development.

A scholar, for example, could create a menu titled "Freshman Year" and then list their freshman year activities in sub menus within the "Freshman Year" menu. With the sub menus the scholar can then post documents, set goals and reflect on each of their activities.

The online portfolios also allow scholars to invite program leadership, faculty mentors and others to view and review their portfolios. Reviewers are able to give scholars feedback on their leadership development and evaluate the scholar's participation in the program. Reviewers are also able to evaluate scholars' progression in the leadership model competencies and coach scholars on ways to improve in their leadership development.

Scholars who maintain a portfolio throughout their ELP experience will have an evolving record of their leadership learning and of their experiences. This record can be used to

show prospective employers their experience and to help scholars reflect on their experiences before interviewing. When scholars graduate from the program, they will be allowed to download the portfolio to a CD in order to retain the valuable database of reflections and documents in an organized leadership portfolio.

ASSESSMENT

ELP is currently working on a rubric to determine adequate growth of each scholar in the nineteen competencies listed in the leadership model. The challenge is to appropriately assess scholars' success in mapping the competencies to the articulated learning outcomes in the model, while fostering creativity and allowing for individualized learning opportunities. The issue is also to provide adequate guidance for self assessment and to cross-validate the results with multiple inputs.

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