Holistic Leadership in Engineering, Cert. (UG)

Program Description

This program for undergraduate students has a competitive application process. Students who complete the Certificate in Holistic Leadership in Engineering will have acquired leadership skills necessary to make a positive impact early in their careers. They will have a strong understanding of capitalism and how businesses operate within a free enterprise system, strengthened leadership capabilities, self-confidence in their ability to influence people, and an interest in serving others.

Outcome 1 – Leadership

Those who complete the certificate will be able to explain authentic leadership and servant leadership theories, and how they can apply them on current and future teams.

Measure 1.1 – Authentic and Servant Leadership Assessment

Students will complete a written or oral assessment in which they are asked to define authentic leadership and servant leadership, and describe both theories in practice. Correct responses will synthesize concepts learned throughout the program, including self-awareness, empathy, creativity, authenticity, service, trust, active listening, voicing, and vulnerability.

We will assess each student's responses for completeness, comprehension, and application examples from student organizations, internships, or plans for work project teams.

Target 1.1

The standard will be met if the student scores 80% or better on the assessment. The target is for 90% of students to meet the standard.

Finding 1.1: Not Met

23% of students scored 80% or better on the assessment. This data clearly shows that we have significant room for improvement in teaching both of these theories and how they apply in engineering. We will introduce the theories earlier in the program. We will incorporate authentic leadership in ENGR 251--Creating a Self-Aware Leader. Readings will include "Discovering Your Authentic Leadership" by Bill George (of Harvard University) and selections from Leadership for Engineers by Dr. Ronald Bennett and Dr. Elaine Millam. We will follow-up the readings with lecture and class discussion, and will develop application scenarios that let students process leadership dilemmas they may face in technical fields and apply the theory. We will introduce servant leadership in ENGR 350--Leading for Impact in Engineering, Business, and Society. We will introduce the material in a similar way--with readings, lecture, class discussion, and application scenarios.

Use of Results 1.1

These two leadership theories can frame much of the leadership content we cover in the program, so the results of this assessment will help us make informed decisions about how

to cover them. We will expand the amount of time we spend covering these theories and will introduce them earlier in the program. Moving forward, we will introduce the theories in the first and second course. We will also expand our teaching approach. In addition to lecturing, we will do a application scenario, case study discussion or simulation on each theory that allows the students to learn more about the theories in practice, and will have follow-on class discussions about leaders they have observed modeling those two leadership approaches.

Outcome 2 – Business Terms and Concepts

Those who complete the certificate will be able to define and explain key business terms and concepts--revenue, costs of goods sold, profit margin, marketing, research and development, etc.--and analyze basic financial statements--balance sheet and income statement.

Measure 2.1 – GoVenture Business Competency Quiz

Each student will take the GoVenture Business Competency Quiz at the conclusion of the team-based business simulation. The quiz covers business concepts including budgeting, revenue, profit, pricing, financial statements, ethics, and strategy. The quiz consists of 19 multiple choice questions that cover the areas listed above. The program automatically scores student responses.

Target 2.1

The standard is a 70% correct response rate on the quiz, and the target is for 80% of the students to meet the standard.

Finding 2.1: Not Met

The target was not met, as only 74% of students scored a 70% or better on the quiz. This is the first year we have used this quiz, but the results affirm our thinking that more instruction is needed around the simulation, and that the simulation alone does not provide enough instruction for them to adequately learn the material.

Use of Results 2.1

This assessment shows that we can improve this portion of the program by adding more reading and lecture before the simulation and discussion after the simulation. In the next running of the course (spring 2022), the instructor plans to lecture on the key concepts prior to the simulation, and to assign supplementary reading to help students understand the material before the simulation. After the simulation, we can revisit the lecture material and discuss as a class how they observed them in the simulation. We think this will help students learn the terms and concepts, gain more from the simulation experience.

Status Update on a Previous Action

In the '18-'19 assessment report, we identified the need to create a rubric to use in providing feedback on the personal leadership portfolio assignment and recognized that this rubric would also help us create a more logical instructional structure. In subsequent runnings of the course we have continued

to refine our instruction and the rubric, based on analysis of the data gathered during the assessment phase. For example, this change led to an expanded lecture on the importance of values and principles in leadership and decision-making to enhance the students' learning about their own personal style of leadership. After the lecture, students were given time to select values that were most important to them, then to write principles to help them make decisions based on those values.

We have not observed any changes in the learning outcome achievement since the action was taken. In the future, we will likely move away from using the personal leadership portfolio for key learning assessment because, by nature, each student's submission is unique and reflective in nature, making it difficult to objectively assess.

Rubric for Measure 1.1

Excellent (90-100)	Satisfactory (70-89)	Needs Improvement (0-69)	Points Possible	Points Earned
Thorough discussion of the theories, including all of the concepts listed below. Response demonstrates a clear command of the concepts and the interplay between them. Response includes specific application examples from student's extracurricular experiences (such as internship or student organizations), or plans to apply the principles of authentic leadership in a professional setting.	Discussion of the theories includes at least six of the concepts below. Response demonstrates familiarity with the terms, but does not contain the thoroughness of an excellent response. Concepts are listed and described in a sequence, but with little or no discussion of interplay or dependencies between them. Response includes general application examples from student's experiences or plans.	Discussion of the theories is incomplete and includes fewer than six of the concepts below. Response does not include application examples.		

Leadership Concepts

- Self-awareness
- Authenticity
- Vulnerability
- Voicing
- Active listening
- Service
- Empathy
- Creativity
- Trust