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An Overview of the Hornet Leadership Program in the College of Engineering & Computer Science at California State University, Sacramento

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Dr. Lorenzo M. Smith Ph.D., California State University, Sacramento

Dr. Lorenzo M. Smith graduated from the University of Illinois, C-U, in 1991, earning his B.S. in Mechanical Engineering. Soon afterwards, he accepted a full-time engineering position at Ford Motor Company in Dearborn, MI, where he primarily engaged in research and development in the fasteners engineering section. While a full time employee at Ford Motor Company, he worked on his M.S. in Mechanical Engineering at Wayne State University, graduating in 1993. Following his long-term plan first seeded during his undergraduate years, Dr. Smith left Ford Motor Company in order to pursue a Ph.D. in Engineering Mechanics at Michigan State University. After completing all required course work by 1996, Dr. Smith accepted a sheet metal formability analyst position at General Motors Corporation. While at General Motors, Dr. Smith completed his dissertation entitled "Solid Finite Elements for Sheet Metal Forming Simulation" and graduated in 1999, earning his Ph.D. In early 2000, Dr. Smith joined Oxford Automotive in Troy, MI where he continued to refine his skills as a sheet metal formability analyst. Since 1998, Dr. Smith complimented his industrial experience with part-time adjunct faculty positions at the University of Detroit, Mercy and Oakland University where he taught Metal Forming and Material Science classes, respectively. Such experiences helped pave the way for his full-time, associate professor position at Oakland University, where he explored a variety of research areas within the mechanics of sheet metal forming arena. Following a sabbatical at the University of Southern California, Dr. Smith recently initiated a parallel research track in the area of biomimetics, where he is investigating the use of biomimetic tactile sensors for the purpose of bio-tissue irregularity detection. In August of 2011, Dr. Smith accepted a position as associate dean in Oakland University's School of Engineering and Computer Science. Dr. Smith has published over 40 articles across various dissemination venues, including peer reviewed journals and conference proceedings. His sponsored research activities are supported by a variety of sources: William Beaumont Hospital, Department of Energy (through the USAMP), United States Automotive Manufacturing Partnership, Ford Motor Company, Chrysler Group, Pacific Northwest National

Labs, China First Heavy Industry, Borg Warner, and Michigan Space Grant Consortium. From 2001 to 2011, Dr. Smith secured approximately $1.8 M in external funding as PI. In addition to his research Dr. Smith has invested heavily into his teaching aspects of his faculty position. He is a recipient of the Oakland University Withrow Teaching Award as well as the Oakland University Kheir Teaching Award. His commitment to serving the community is highlighted by his involvement with under-represented pre-college students. Over the course of the past decade, Dr. Smith has delivered numerous presentations and short-workshop courses to under-represented pre-college students in the Detroit area. He is an active Detroit Area Pre-College Engineering Program board of directors member, a faculty advisor for Tau Beta Pi, a member of the American Society of Engineering Education, participant in the North American Deep Drawing Research Group, and has co-chaired the 2005 Numisheet (International) Technical Conference. Most recently, Dr. Smith brought to Oakland University CLIC-form (Chrysler Learning and Innovation Center for Sheet Metal Forming), which is a first-of-its-kind program for producing ”work-ready” graduates who plan to enter into a career in sheet metal stamping.

Prof. Susan L. Holl, College of Engineering & Computer Science, California State University, Sacramento

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Abstract

The purpose of this article is to present an overview of the activities undertaken in the College of Engineering & Computer Science (ECS) at California State University, Sacramento's (Sacramento State) with the Hornet Leadership Scholars' Curriculum. The Hornet Leadership Program (HLP), launched in 2018, addresses some of our potential gaps in engineering leadership education. The program includes instruction on principles of leadership, seminars by industry leaders, leadership practice and reflection, discussions, one-on-one mentoring, leadership development in student organizations, and community activities. The program also reinforces the educational process by creating opportunities for participants to be coach/mentors for less experienced students as they progress in the program. The HLP allows students to enhance their engineering leadership training through direct application of leadership principles. As we grow the HLP, we have formulated three pillars of opportunity to encourage wide participation throughout the College. This paper describes the curriculum and our implementation of our engineering leadership program. The student feedback, outcomes assessment, and improvements will be published in a subsequent article.

Introduction

The National Academy of Engineering (NAE) [1,2] has stressed the need for engineers to possess leadership abilities. The NAE has also emphasized that engineering graduates must understand the principles of leadership, have some experience in the applications, and be able to practice their leadership in realistic settings in order to be successful in a modern,

fast-paced environment. Throughout the career of an engineer the introduction of new technologies, increased global competition, changing customer tastes, increased efficiency, and faster time to market will require skills outside of the technical realm. As we continue to provide high-quality technical academic curricula, concurrent development of leadership abilities will ensure the continued success of our engineering graduates.

Many engineering schools have realized the need for such leadership education and have designed programs with the acknowledgement that it is difficult to add requirements to an already overloaded technical curriculum. These leadership programs range from offering majors [3] and minors [4,5,6] in engineering leadership, and certificates [7,8,9] to supplemental programs [10,11]. A survey of best practices on engineering leadership education from over 40 colleges by Paul & Falls [12] reveal five themes that emerge as the fundamental goal of engineering leadership education programs: effective leadership, innovation and technology, independent learning, experiential learning, and systems thinking. The analysis of the competencies developed found a diverse spread across the programs. Overall, six key competencies emerged: communication, innovation, creativity, execution, personal drive, and teamwork. Classen, Reeve, Rottmann & Sacks [13] undertook a survey of North American universities and were able to categorize all engineering leadership programs into three clusters: technical integration, developing social impact, and influencing core curriculum. A popular option adopted in many schools [4-11] is the creation and implementation of engineering leadership development programs which are positioned to supplement the engineering education awarding academic credit, certification, or both. Some of these programs, particularly the Gordon-MIT Leadership Development Program culminating in certificates of leadership at the undergraduate level [7], the Gordon-Northeastern Leadership Program at the graduate level [14], and the Penn State Engineering Leadership Development Minor [4], are successful engineering leadership models which have been in existence for many years and serve as prime candidates for benchmarking purposes.

In developing Sacramento State's HLP program, an effort was undertaken to benchmark established engineering leadership education programs of various sizes and scope before designing a curriculum which fits our needs. Our primary goal was to take inventory of best practices regardless of their size and scope.

Benchmarking Various Engineering Leadership Development Programs

The MIT-Gordon Leadership program [7], Northeastern-Gordon Leadership program [14], University of California, San Diego-Gordon Leadership Center [8], and the University of Kansas-Engineering Fellows Program [11] were considered for the in-depth benchmarking study. The ASEE conference (LEAD Division, 2019) also enabled us to benchmark over 40

engineering schools with leadership programs in attendance [15]. Below is a summary of key take-aways on best practices from this study:

- The whole spectrum of program maturity was represented, from mature programs with over 10 years of successful practice to future programs in development.
- Undergraduate engineering leadership curricula placement varied. Examples of placements include Major, Minor, Certificate, course electives, integrating leadership fundamentals into required freshman seminar, in-class lectures, and capstone projects.
- Leadership curricula consisted of four themes of leadership influence: 1) Self, 2) Interpersonal, 3) Team, and 4) Organizational/Societal.
- Common themes in curriculum consisted of leadership theory, practice and reflection, team building exercises, seminars by industry leaders, leadership capability assessments, and student leader coaching, all with continuous improvement of curricular components.
- Leadership learning outcomes were measured by: 1) Effective leadership, 2) Synthesis and problem solving, 3) Practical competence and 4) Change agility.
- Consistent with the trends in industry, topics such as Ethics [16], Systems Thinking [17,18,19], Innovation [20] and Peer Coaching [21] have gained emphasis in the leadership curricula.
- Leadership teaching faculty in many schools were from professional career track with many years of industry leadership experience.
- There is an increasing trend among schools who have received grants from philanthropist and foundations to establish their engineering leadership programs.
- An Industrial Advisory or Affiliates Board was established to help steer the program towards industry relevance, mentorship of students, participation in leadership labs [7], internship/job placements, with annual membership fees to sustain the engineering leadership programs.
- The leadership program course offerings were constrained, in general, due to increase in the number of technical/non-core courses in engineering curricula and with no increase allowed for student instructional credit hours for graduation.

The above findings were used as a guide to design the HLP Scholars curriculum at Sacramento State. It should also be noted that most colleges tailored their programs to fulfill their goals and objectives subject to their own constraints and challenges.

The Engineering Leadership Program Development at Sacramento State

Sacramento State's College of Engineering & Computer Science (ECS) awards both BS and MS degrees. The College of ECS consists of five departments with six undergraduate majors, has a faculty of 111 (including part-time faculty) and serves an undergraduate enrollment of 4310 students (as of Spring 2020). The Sacramento State engineering leadership development program, presented in this paper, was launched as the Hornet

Leadership Program (HLP) in August 2018 with a focus on the undergraduate student body. The program operates under the assumption that leadership can be taught, and every student has the potential to be a leader in their career. It is a model tailored to the specific needs of Sacramento State and leverages best practices of other universities. This innovative program aims to provide engineering and computer science students with multiple paths to engagement in technical leadership, with avenues for the development of engineering leadership knowledge, tools, and skills to navigate the demands of leadership particularly in a technical career. Based on sound leadership best practices, it offers undergraduate students opportunities to engage in leadership theory, practice and reflection, faculty/industry coaching, industry leader seminars, and to infuse leadership practices across a variety of opportunities in ECS, with a special focus on student professional organizations.

The HLP is administratively housed at the College level. The HLP Director reports to the Dean of the College of ECS. The initial funding was solely from industry donations which remained the funding source through Fall 2020. To augment the program various grant opportunities were explored and in 2020 an NSF grant was awarded that will allow expansion of the HLP to create additional courses, include more student participants, add Peer-Assisted-Learning (PAL) leader opportunities, add sponsored project opportunities, and extend the HLP to the College of Natural Science and Mathematics (NSM) at Sacramento State. The initial steps of the expanded program will begin in Spring/Summer 2021.

The HLP consists of three pillars as described in Fig.1. The description of each of the pillars is outlined below.

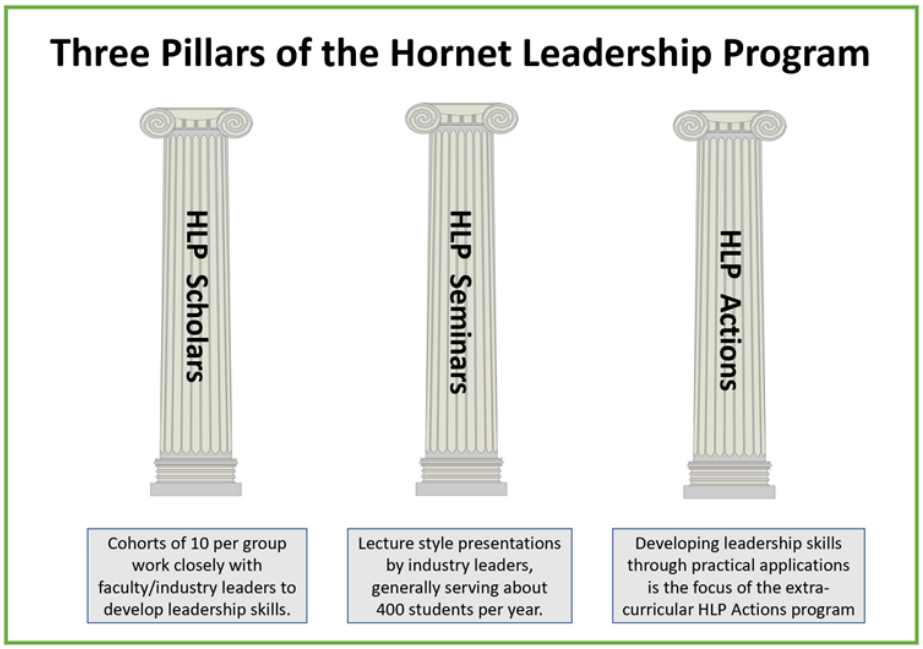

Fig. 1: A brief overview of the Hornet Leadership Program

I. HLP Scholars

The HLP Scholars consists of several cohorts totaling thirty to forty students each academic year. Admission into the HLP Scholars is primarily focused on sophomore/junior year students and is a result of a competitive application process. The screening criteria are based on the application, prior academic performance, student leadership experience, community service and recommendations from faculty/staff. The selected students (HLP Scholars) are placed into cohort groups of ten and are awarded stipends provided by industrial sponsors. They learn leadership theory, practice, and self-reflection based on the HLP Scholars curriculum in small group workshops, and through seminars presented by industry leaders. They build a close connection with the industrial sponsors through executive mentorships, industry visits/networking events, and internship/job placements. The Scholars program is designed for a duration of two years. The cohorts who have successfully completed the two years of engineering leadership training are awarded an HLP certificate. Initially participation in the HLP Scholars did not carry academic credit toward graduation. We believe participation significantly enhances the Scholars' education and should be evident in their collegiate record. To address this issue, during the 2020-21 academic year the Scholars were enrolled in a place-holder course as a new proposed "Leadership Development" course moved through the course approval process. Beginning in Fall 2021 the Scholars will enroll in a

credit bearing HLP course that will allow this activity to be officially transcripted. Because of the enthusiastic response from the participants, a few of the scholars who have completed the two-year curriculum, will also have the opportunity to serve as coaches for the newly selected first-year scholars. An overview of the HLP curriculum will be discussed in a subsequent section.

As is occurring nationwide, a focus on creating impactful opportunities for first generation and historically underrepresented students is of primary importance in the selection of the HLP Scholars. Although the application is made available to all students, a targeted invitation is sent to students who have indicated potential but might not see themselves as leaders. For the last several years the College of Engineering & Computer Science at Sacramento State has had a fairly consistent student population that is about 16% female, and 31% URM. The Scholar groups have been slightly greater than 50% female, and greater than 50% URM.

As a pilot, the first cohort of Scholars was selected from applications submitted from a general call. These students were all excellent and deserving, however the decision was made to try to encourage students from all backgrounds, hence the practice of more targeted invitations as a recruiting strategy. The final Scholars groups were within one or two percentage points of the demographic of the final individual applicant pools. Specifics of the various Scholars group demographics compared to the College are in the table below.

	ECS College	2018-19 Scholars	2019-20 Scholars	2020-21 Scholars
Asian	25%	10%	26%	14%
Black	4%	20%	13%	17%
LatinX	27%	60%	39%	44%
White	24%	10%	13%	14%
Other	20%	-	9%	11%

Table 1: HLP Scholar vs. ECS College Demographics over Three Years

II. HLP Seminars

The industry leader seminars are open to all students at Sacramento State. They are facilitated by experienced business leaders from large private sector corporations, small businesses, start-ups, governmental organizations, non-profits, non-governmental organizations (NGOs), and academics who present our engineering students with different aspects of leadership attributes in industry. The speakers are selected based on their technical proficiency and their abilities to engage an audience of primarily undergraduate

students. Speakers must also be representative of the diverse student population in the program and should expose students to different leadership perspectives and styles. The seminars typically are well attended (close to 400 students) and cover a broad array of leadership experiences. HLP Scholars are required to attend the seminars in order to fulfill their HLP certification requirements. The seminars are also leveraged by other engineering departments in order to fulfill certain programmatic requirements.

The seminar speaker also functions as a coach, working with ECS faculty during the HLP Scholar workshops. The speaker is informed of the instructional content ahead of the workshop so that real-world examples can be discussed as a supplement to the instruction. The seminar speaker also acts as a mentor to HLP Scholars

III. HLP Actions

The College of Engineering and Computer Science at Sacramento State is committed to educating our students to ensure they will develop into strong technical leaders prepared to contribute in all aspects of the 21st century workplace. Consistent with our technical curricula which include significant application-oriented work, ECS students are all encouraged to participate in any leadership roles and actively engage in leadership opportunities as they are presented to them. Examples of these opportunities are:

- Leadership in student organizations
- Leadership as an elected Associated Students (AS) Board member
- Leadership as a Peer-Assisted-Learning leader
- Leadership in academic group work
- Leadership as a University New Student Orientation Leader

The signature HLP Actions event is the ECS Student Leadership Conference. ECS is home to approximately 40 student professional organizations, some based on major interests, some focused on succeeding at competitions and others based on community interests. The ECS Student Leadership Conference is a day-long meeting held annually in Spring to which the leadership teams of all student professional societies and the AS leaders are invited. The conference provides an opportunity for the leadership teams to learn how to be more effective as they work together and provides incentive for students to practice their leadership as undergraduates. Each organization's faculty advisors are encouraged to attend and participate in a focused presentation on how to support the ECS organizations. The day-long event includes:

- Panel discussions from alumni who have demonstrated success on their leadership experiences and how to improve leadership skills
- Hands-on workshops led by facilitators on various aspects of leadership tactics, teamwork,

goal setting, project development, and inclusion
- Focused team discussions on improving the campus visibility and specific goals of each student organizations.

Professional development workshops to help the officer team determine how best to build and sustain their organizations' success are the core activity component. These workshops are led by trained facilitators from outside the college. The student participants are encouraged to focus specifically on developing a plan for the next academic year to enhance their organization's success. As these student leaders become more effective, their organizations become more successful; with increased membership an opportunity for additional hands-on leadership training is created.

An HLP Leadership Incentive Award is offered to those organizations who attend the conference and apply with a detailed plan for what the group would like to accomplish in the next academic year. The impact these organizations have on the college, community and the student body are taken into consideration in the allocation of award funds.

HLP Scholars Curriculum Development

Based on our benchmarking exercise of various schools [3-14], the HLP Scholars curriculum is segmented into sixteen modules as shown in Table 2. The modules are tailored to cover a two-year instructional period in which Scholars are taught leadership theory and participate in team exercises. The modules are taught in conjunction with industry leaders and Sacramento State faculty that enables the content to be replete with real world examples. At the end of every module, HLP Scholars are encouraged to reflect on the learning content, identify self-improvement areas and action plans to achieve their goals.

The program begins with an off-site team-building activity at the beginning of the academic year. This strengthens personal interactions, trust, confidence and team work. The first three modules described in Table 1, are meant to be an introduction to the curriculum, leadership theory [22] and the benefits of having leadership skills to increase career success after graduation. Once the Scholar gains some grounding on leadership theory, he or she goes through a self-reflection exercise using the DISC tool [23] and Leadership Capability Assessment Tool shown in Fig. 2.

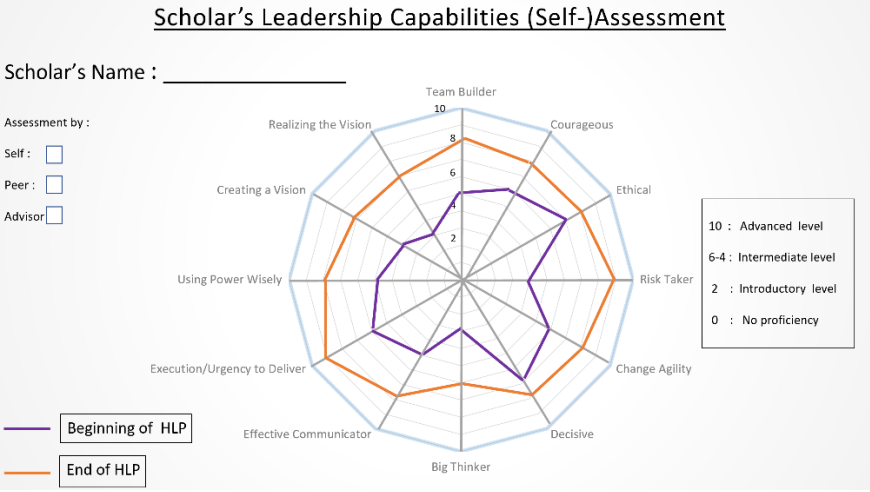

Fig 2: HLP Scholars Leadership Capability Assessment
[Modified version from Northeastern University's Gordon Program [14], 2019]

The HLP Scholar's leadership capability assessment is performed by each HLP Scholar. The Scholar also identifies two peers who are familiar with his or her leadership ability to perform the capability assessment (of the Scholar) before meeting with the mentoring faculty. During the meeting, the initial assessment is finalized after taking into consideration any differences between self and peer assessments. A development plan to improve leadership capability gaps is discussed and agreed upon with the faculty. Two more assessments are undertaken by the Scholar at the end of 1st and 2nd year of the curriculum in order to assess each Scholar's progress in acquiring leadership skills.

The leadership capability portion of the curriculum is segmented into eleven modules (Modules 4 through 14) which mirrors the assessment tool discussed in Fig.2. These focus on enhancing the Scholar's leadership capability through instruction, practice and reflection. Table 2, below, illustrates the learning outcomes for each of the modules.

#	Leadership Module	Learning Outcomes
1	Leadership Curriculum Overview	• Understand the HLP instructional approach • Assess the capabilities of an engineering leader • Describe the profile of an exemplary leader
2	Success factors for an Engineering Career in Industry	• Understand the linkage between organizational success and personal success • Highlight the importance of business etiquette & time management skills • Describe the intellectual property of an organization
3	Effective Leadership Styles	• Understand the difference between leadership and management • Assess various leadership styles employed in current organizations • Describe the capabilities of engineering leadership
4	Reflection & Personal Development	• Understand a cohort's: self-Awareness, interpersonal and teaming

	Plan	behaviors • Perform personal assessments with MBTI or DISC tools • Develop the leadership capabilities self-assessment tool and improvement plan
5	Big Picture /Systems Thinking	• Understand the key elements of big picture thinking for engineering leaders • Develop a basic knowledge of systems thinking and problem-solving tools in engineering • Understand the importance of having a global & societal mindset in developing effective solutions
6	Ethical Leadership	• Outline the stages of moral development in Society • Articulate five lens or viewpoints of ethics in engineering • Practice ethical reasoning through case studies
7	Courage	• Reinforce ethics and courage are critical leadership capabilities which could be honed through practice • Introduce courage building tools (from Brené Brown [26]) • Practice courage building exercises
8	Team Building	• Highlight the stages of team development & team dysfunction • Manage team conflict, diversity/inclusivity and unconscious Bias • Enhance creativity and motivation in a team environment • Create and execute a vision for the team or organization
9	Risk Taking	• Highlight the benefits of risk taking in today's environment • Describe various models of innovation and risk taking • Overview of risk management tools and techniques
10	Change Agility /Management	• Highlight leadership behaviors that embrace change • Understand change agility in leadership • Outline the change acceleration process in an organization
11	Decisiveness	• Highlight decision making as a process • Outline the five lenses through which ethical decisions are made • Describe engineering tools used in decision making
12	Execution Focus	• Highlight the behavioral traits of leaders on execution • Understand project management framework and tools • Describe the change acceleration process in an organization
13	Effective Communication	• Highlight interpersonal communication skills • Describe structured communication used in industry • Understand negotiating and influencing skills
14	Using Power Wisely	• Understand the six bases of power • Describe empowerment/delegation and the use of SMART framework • Recognize emerging trends in leadership
15	Discovering your Authentic Leadership Style	• Discuss HBR Article on Authentic Leadership • Summarize the key facets in discovering one's authentic leadership • Outline the development of an authentic leader
16	Self-Reflection on Growth as a	• Revisit Leadership Capability Tool to asses Improvements

	Leader at the end of HLP	• Compare against current vs. original stated plan • Outline Improvement areas to work on for the future

Table 2: Description of HLP Learning Modules and their Outcomes

Module 15 is composed of a Harvard Business Review (HBR) article which pulls all the previous modules together so each HLP Scholar will discover their own leadership style [24]. It is primarily a reflection exercise to help them discover more about themselves, what motivates them, and to chart a path based on their values and principles. Module 16 revisits the leadership capability tool (Fig. 2) in order to assess the growth of the Scholar's leadership capabilities and to identify areas that need further improvement. The Scholars are expected to write a brief summary of their journey through the HLP, assess their progress through the overall learning outcomes outlined in the section below (Table 3) and offer any recommendations for continuous improvement. The recommendation is considered for the next cycle of the curriculum as part of the assessment and continuous improvement strategy. The HLP curriculum is expected to have major revision when necessary so that the content remains up to date and reflects the latest trends on leadership thought and practice.

HLP Scholars as Coaches

Student peer coaching is considered a best practice in more mature engineering leadership programs [4,7]. The HLP Scholars are mentored by instructional faculty, industry sponsors, and seminar speakers. The Scholars also attend on-site networking events offered by industry sponsors and have personal coaching sessions by industry executives and managers. This makes the mentorship well-rounded. Over time, HLP Scholars may attain a comfort level with their faculty advisors and industry sponsors reinforcing the knowledge and skills Scholars learn from their mentors and allowing them to serve as peer mentors to other students. As they complete the two-year HLP Scholars curriculum, graduates of the HLP Scholars will be given an opportunity to serve as mentors to the incoming first-year Scholars.

HLP Metrics for Overall Learning Outcomes

The HLP metrics for overall learning outcomes were adapted from the learning outcomes from Gordon-MIT's Capabilities of Effective Engineering Leaders [7], UCSD Gordon Center's Engineering Leadership Core Values [8], Purdue's Engineering Leadership Program [5], and Cox, et. al. [25].

Table 3: HLP Metrics for Overall Learning Outcomes

Student Learning	Skill Sets	Rating (1-10)

Outcomes		
Effective Leadership	• Motivate and empower others to solve problems • Willingness for initiative-taking, goal-setting, and follow through • Identify characteristics and talents of others • Understand the impact of ethics and morals on leadership and professional responsibility	
Change Agility	• Understand change processes and overcoming inertia to change • Adjust objectives and priorities to changing environments • Possess comfort level with multidisciplinary, multicultural, and multifunctional scenarios	
Synthesis & Problem Solving	• Comprehend, synthesize, interpret and apply knowledge to address technical and non-technical problems • Recognize social and business factors in engineering • Assess impact of engineering work on the broader society • Drive leadership development with personal experiences	
Practical Competence	• Demonstrate competence of practical and transferrable skills essential to leadership practice and interactions • Ability to communicate using written language, verbal and non- verbal language, and electronic and multimedia tools • Ability to articulate acquired skills and tools on a resume, portfolio and other professional mediums	

(10 – exceeds expectations, 5 – meets expectations, 1- needs major improvement)

At the completion of the entire HLP experience, HLP Scholars will have adequate exposure and experience to enhance their understanding of leadership capabilities within the following contexts: effective leadership, change agility, synthesis and problem solving, and practical competence. The goal is to have all the stake-holders of the HLP rate the effectiveness of the program with respect to the four broad areas listed in Table 3. The stakeholders include Scholars, Sponsors, Employers, Industrial Affiliates/Advisory Board, Dean/Department Chairs, and Faculty. At the end of the academic year areas of improvement will be identified and adjustments to the curriculum made. As the program grows we will also be asking employers to rate our alumni on leadership skills and potential, and we will correlate the results with how much the particular individual participated in any of the HLP pillars (Fig. 1).

HLP Progress and Future Plans

The Scholars are eager participants in the curriculum. Their feedback to date has been extremely positive. We were unable to complete the year-end survey due to the pandemic last year. Plans are in place to conduct a comprehensive survey at the end of the Spring 2021 semester. The results of survey will be presented at the ASEE ’21 conference.

The Annual HLP Student Club Leaders Conference has been rated by over 90% of the participants to be extremely effective or effective. The details of the survey will also be presented at the ASEE’21 conference.

The main challenge we have been addressing is meeting the requests of additional students to participate. Our industry sponsors and advisors have been encouraging expansion. A recently awarded NSF grant and additional industry grants have provided a path to this expansion. This will require a phase-out of the previous HLP Scholars cohorted program, and the 2021-22 year will be the final year of that structure. Starting Fall 2021, the HLP will offer the Scholars course to all students who have completed at least 24 units in the College of ECS or NSM curriculum. After completing this course, students will be allowed to apply for a limited number of HLP Summer Scholars project awards. These students will be mentored through a project planning process over 10 weeks in the summer. During the summer these students will work in teams and various faculty and staff to develop plans for projects which will have a beneficial impact on the college. Some Summer Scholars will be allowed to implement the project they planned during the following year.

As we continue to develop the HLP we will continue to assess all aspects including impact on participants careers. Our goal with the HLP is to provide meaningful and impactful co-curricular experiences to complement the traditional curricula.

Summary

The NAE has determined that leadership training is an essential skill for the 21st century engineering graduate. Leadership training has gained momentum in engineering schools across North America, taking on many forms. This paper provides an overview of a newly created Hornet Leadership Program (HLP) in the College of Engineering & Computer Science at California State University, Sacramento. Leveraging best practices from successful engineering leadership programs in the U.S. at institutions such as the Massachusetts Institute of Technology, Northeastern University, the University of California, San Diego and others, this new program utilizes modular instruction, leadership practice, mentoring by industry sponsors and faculty, experiential learning, and guest

speakers to help students define and to take ownership of engineering leadership principles, practices, and tools learned in a diverse cohort-based environment. Unlike most leadership programs in other schools, this program is not offered for college credit. It offers a stipend provided by industry sponsorship to selected cohorts who commit to two years of focused leadership training. These students are awarded a certificate at the end of the program. While certain elements of the program are open to all students and organizations in the College of Engineering & Computer Science, the modular leadership curriculum is focused on the HLP Scholar cohorts. All students are encouraged to apply for the HLP Scholar cohort program, the selection, however, is limited at 30 to 40 Scholars per year.

The above model is unique and, therefore, may not be suitable for other engineering schools as the size, scope, and specific goals will be different from school to school. We believe this is the most efficient model of a co-curricular leadership development program based on our constraints. We are engaging a new generation of engineering leaders while they are developing their technical expertise. The program operates under the premise that leadership can be taught and every student has the potential to be an engineering leader. In engineering practice, especially in today's global and fast paced environment, effective leadership, change agility, integrity, and problem-solving skills are important qualities for successful technical professionals. Helping students develop the skills and tools to practice effective leadership is imperative. Our intention is to develop a continuous assessment and improvement effort in engineering leadership education at Sacramento State as the HLP grows and industry needs change.

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