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The John Lof Leadership Academy at the University of Connecticut-WIP

Aida Ghiaei, University of Connecticut
Alanna Marie Gado
Francesco Rouhana
Tasnim Zaman
Mahjabeen Fatema Mitu
Mayowa Festus Oladele
Adaeze Maduako, University of Connecticut
Suman Kumari, University of Connecticut

Assessing a Multi-Year Leadership Program for Engineering Graduate Students: A Work in Progress

Abstract

Engineering PhD programs in the U.S. engineering focus almost exclusively on imparting technical content and deep subject matter expertise and fail to provide the leadership, communication, and cultural competencies increasingly required of today's high-tech workforce. The John Lof Leadership Academy (JLLA) is an innovative leadership program for engineering graduate students that was founded at the University of Connecticut in 2018 to create culturally competent visionaries in the field of engineering. John Lof Scholars develop their leadership abilities through focused training, specialized workshops and seminars, and active learning. Run by graduate students from various departments based on a "for us, by us" program philosophy, the JLLA empowers its members to develop as leaders in their fields by aiming leadership training through the lens of each individual's career and personal goals. Academy members hone their skills through hands-on learning and practice provided through collaboration with and outreach to communities both within and outside the university, from whom they receive mentoring and support. Recently, the JLLA sought to assess the effectiveness of the program by means of a multifactor leadership questionnaire (MLQ), Journal Prompts and quizzes /testimonials with mixed preliminary results. While anecdotal evidence indicates the academy's program is, indeed, succeeding in instilling leadership skills among engineering graduates, no formal study has yet been completed. By producing the research described here, the JLLA hopes to establish its program as a model for LEAD division members for fostering the development of inclusive, diverse, and equitable engineering leaders, educators, and researchers and to help bridge the gap between traditional academic graduate studies and the workforce demand for practical and applied leadership skills.

LEAD Division strategy priority: Inform.

Key project objective: To assess the effectiveness of an innovative engineering-specific leadership group for graduate students.

Project context: A study by the National Academy of Engineering identified technical competence, business acumen, communication skills, leadership ability, and a global perspective as key skills for engineering leaders [1]. The development of graduate students' leadership abilities through a program dedicated to that purpose is essential to prepare them for their future roles as leaders in their respective fields [2]. All should be encouraged to build up their individual leadership portfolios [3]. The graduate students in such a program can acquire knowledge and learn and practice distinct and direct skills and values relevant to leadership. Included in these are ethical decision making, communication, and networking [2–6]. Throughout its course, the program can continually improve in terms of both its curriculum and the leadership skills it confers [4], adapting to the current academic environment and reflecting the members' evolving leadership goals. The following work outlines a pathway to address the need for leadership development targeted for graduate engineering students.

The John Lof Leadership Academy (JLLA) at the University of Connecticut is a selective program that seeks to develop and enhance the leadership skills of engineering graduate students. In 2018, the UConn School of Engineering established this program specifically for these students based on a philosophy of "for us, by us" (that is, for the students, by the students). While other universities may offer similar programs, this philosophy behind its design is what sets the JLLA apart. Participating students are involved in creating and completing their own workshops which not only facilitates learning but also increases their exposure to the subject matter. The program is guided by an advisory board of three faculty members: the Dean of the School of Engineering, the Associate Dean of Research and Graduate Education, and the Director of Graduate Outreach and Diversity for the School of Engineering. It places special emphasis on workshops and invites faculty and staff from UConn and other interested individuals from outside the university to contribute to the program. This provides a platform for participants to learn from experts across multiple fields and gain a more comprehensive understanding of the subject matter. The involvement of UConn faculty as advisors and speakers in particular adds significant value to the program and enriches the learning experience for all involved.

The JLLA empowers its members to develop leadership skills through hands-on workshops on such topics as "developing leadership philosophy," "cultural competency," "leading, micromanaging, and mentoring," and "ethics, pragmatism, and risk-taking," among others. Members also engage in outreach projects and are provided with individualized assessments

geared to the career and personal goals of each. Participation in the program provides myriad benefits to members, including mentoring from industry representatives and UConn Engineering leaders, resume building, exclusive JLLA-related grants and fellowships, faculty social hours (providing interdisciplinary networking), and a professional community through which members can make meaningful connections, have fun, and be a force for change. This unique program helps to bridge the gap between traditional academic graduate studies and the workforce demand for practical and applied leadership skills, while aspiring to create culturally competent visionaries through the engagement and mentorship of communities inside and outside the university. The program adapts to the current academic environment and reflecting the members' evolving leadership goals by embracing a four-dimensional model of Engineering Leadership: Self-Awareness, Awareness of Others, Problem Awareness, and Ethical Awareness (Fig. 1).

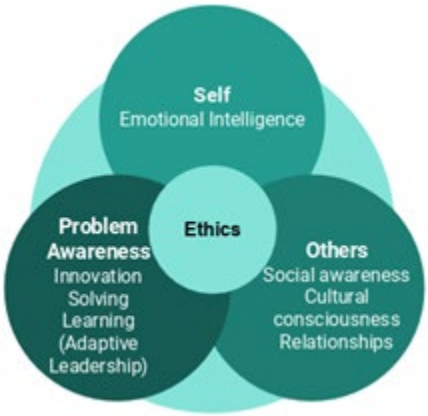

Figure 1: Four domains of engineering leadership covered in the JLLA curriculum.

The JLLA has an executive board selected through nominations and voting by the general body. A student-run program, the JLLA selects its members through a rigorous annual process that examines students' academic standing and achievements, as well as their past experiences and commitment to engaging in a variety of extracurricular activities [7]. The program aims to accept at least 90 percent of applicants each year, depending on the number of applications received. Once accepted, the members form a cohort that embarks on a two-year curriculum in which they split up into committees to explore leadership through such topics as conflict resolution, ethics, public speaking, feedback skills, adversity and diversity, and introspection on leadership values and

styles. JLLA inducted its fourth cohort in October 2022, bringing the total number of its members since inception to 68.

The JLLA fosters the development of inclusive, equitable, and diverse engineering leaders, a goal it promotes by trying to ensure all engineering departments are well represented during the selection process. The program emphasizes the importance of collaboration and teamwork and provides opportunities for participants to engage in community service and outreach projects that empower the graduate student community. The workshops and seminars are also curated in such a way as to highlight the leadership values necessary for participation in these projects, to promote active learning, and to make sure fellows are well equipped for productive involvement.

Recently, the JLLA expanded its activities by taking on an outreach project to address food insecurity among graduate students at UConn. JLLA views this effort multi-pronged, it provides a realistic opportunity for JLLA members to take on leadership roles on a topic that is important to them and their community, and they hope to make a difference. Multiple surveys and studies on students at the UConn Storrs campus [8] and graduate students in general have been conducted [9,10]. These studies identified several contributing characteristics associated with food insecurity, as well as their impact on students. These studies indicate a need for further assessment and intervention to address the issue of graduate food insecurity.

Conducted by its 2022-member cohort, the JLLA's outreach project began work with affiliate organizations on campus and local food share resources to help quantify and address this complex social problem at UConn. Its main purpose was to increase food accessibility for all graduate students and develop a one-stop shop for food insecurity information and resources, which will include information related to available resources on campus (including food locations and pricing on or near the campus) and information on healthy nutrition, as well as on inexpensive and accessible meals. The diverse population of graduate students and the diversity of their food needs makes this initiative an ambitious one, and it is in an early stage, with the information-gathering process still underway.

The central question of the present research is, are the approaches and design of the John Lof Leadership Academy beneficial to members in developing their leadership skills? This study is a work in progress that seeks to assess the program's effectiveness in this regard.

Conceptual framework: The JLLA sought to assess the effectiveness of the program in terms of its ability to raise leadership skills through three assessment methods: a multifactor leadership

questionnaire (MLQ) from Mind Garden, Journal Prompts, and quizzes. MLQ is an "independent publisher of psychological assessments and instruments in Leadership, Self Esteem, Anxiety, Burnout, and many other areas" [11], which we used to compare periodic self-assessments performed by JLLA members to measure their overall leadership progress. The method also allowed assessments to be performed by non-JLLA members, such as faculty, staff, and peers, who directly interact with the individual members in their respective day-to-day activities. Journal Prompts are sets of questions sent to members after each JLLA workshop to allow them to provide feedback on their experiences in the workshop. Testimonials are short interviews conducted on current and previous JLLA members on their own personal assessment on how the leadership program has affected their leadership abilities.

Research methods, evaluation, or assessment practices: JLLA aims to develop leadership and professional skills in graduate engineering students through a collaborative "for us, by us" approach and curriculum. The student lead program enhances leadership skills through specialized workshops and seminars, targeted training, and hands-on learning experiences that extend beyond the confines of the UConn campus. The workshops address a diverse range of topics, including leadership development, communication skills, ethical decision making, conflict resolution, feedback skills, and more. Typically, they are structured to provide a fundamental understanding of the topic through presentations, interactive activities, and informative sessions conducted by subject matter experts. The speakers for the workshop are drawn from the university (comprising faculty or staff) and industry (UConn Alumni), based on their expertise on the topics. One of the most beneficial aspects of the workshop is the opportunity for group discussion, through which participants, who come from a variety of engineering, cultural, and personal backgrounds, can learn from one another and exchange ideas through games or case studies. The program also fosters networking opportunities across various engineering disciplines and encourages participation in community service projects.

The JLLA's investment in Mind Garden's Multifactor Leadership Questionnaire (MLQ) was intended to gain an understanding and assess the effectiveness of members' participation in terms of improving their leadership skills and strengthening their self-identification as leaders [11]. The MLQ is a validated instrument widely accepted as a tool to measure transformational, transactional, and non-leadership scales. Using a multi-rater form that includes self, supervisor,

and supervisee assessment, it describes transformational leadership qualities and helps individuals identify where they stand in their own eyes and the eyes of those with whom they collaborate. Also included is a retesting suite to track progress in leadership style. The report produced by the survey entails a quantitative and qualitative analysis summary through average scores, from members and outside reviewers, along with associated benchmarks. For data privacy purposes, third-party researchers are hired to run statistical analyses of changes in self, peer, supervisor, and supervisee measures over time. To avoid biases, no incentives are offered for respondents [12,13]. This mixed-method research measures changes in leadership skills and breaks down each leadership aspect accordingly.

The Journal Prompts were introduced in the 2019 cohort to assess how well the workshops had succeeded in enhancing the leadership abilities of the academy members who attended them. Each member is assigned to three workshops, in the fall, spring, and summer semesters, respectively. After the completion of each workshop, the prompts, which are created using a Google form, are shared with the participants for their responses. The participants are quizzed on the topics discussed to gauge their understanding of them, their importance, and how they can be practically implemented in the members' day-to-day leadership activities. In addition to providing an additional assessment tool that helps to reflect their takeaways from the workshop activities, these quizzes create self-awareness among the members about their leadership skills.

Testimonials are optional self-reflections and reviews from current JLLA members and JLLA alumni. These are qualitative self-assessments on the program's effects on a variety of leadership skills and how they have impacted the individual's current status in either their graduate program or early career. This highlights the individual's assessment of their own experiences.

Preliminary results: The initial MLQ survey and follow-up interviews were not a success, largely because of the low level of response (that is, a response rate of approximately 30 percent for the re-surveys). Among other problems, non-JLLA reviewers were often unavailable, and university attrition through early graduation and research lab transfers led to difficulties in obtaining responses from the student members. In addition, the findings were subject to bias because of members' reluctance to appraise their leadership capabilities more stringently. Unfortunately, in short, the results produced by the JLLA's administration of the MLQ were not useful to this analysis.

The information yielded by the Journal Prompts was more useful. The average attendance at the workshops was 88 percent, and all the members who attended responded to the prompts in full. In their responses, about 95 percent provided feedback indicating how beneficial the workshop was in improving their leadership skills. In fact, 62 percent of the respondents described real-life scenarios and situations in which they had had to use some of these leadership skills. The remaining 5 percent found the workshops not so useful because, they said, they already knew about those topics, and they suggested leadership topics that could be discussed instead in future workshops. The responses to these prompts have been very helpful to the JLLA executive board in making important decisions as to whether certain topics should continue to be covered in workshops conducted for subsequent cohorts or replaced by new topics also centered on leadership.

Anecdotal evidence indicates the academy's program is, indeed, succeeding in instilling leadership skills. The following are among the statements from members who have graduated, attesting to its effectiveness:

As stated by one PhD graduate, "The things that I have learned from JLLA, I don't know how else I would have got that." The individual believes the JLLA is unique in its ability to tailor its program to meet the needs of everyone, allowing individuals to grow in their own way. They credit the program with improving their leadership skills, particularly in terms of accommodating diverse individuals and knowing when to set boundaries.

Similarly, another PhD graduate, who is currently employed at a large semiconductor company, mentioned that the academy helped them "gather the resources necessary to grow and empower." They added, "I know how to be effective in whatever I do."

A third PhD student claimed their experience at the JLLA allowed them to "step outside of [their] research while developing other important skills." According to them, the academy, "caters to case-specific needs and really forces introspection." It is about pushing the boundaries of comfort and learning to advocate: "There is no better way to help yourself than to look inward."

As impressive as these testimonials are, to date, no formal study has been conducted to verify how effective the efforts of John Lof Leadership Academy to build leadership among engineering graduate students really are. By continuing the research described here, the JLLA hopes to establish its program as a model for LEAD division members for fostering the development of inclusive, diverse, and equitable engineering leaders, educators, and researchers.

Implications for engineering leadership research and/or practice: The results of this research will not only help inform leadership academy design for graduate engineering students; it will also serve as foundational groundwork for understanding the types of activities that are most effective in developing graduate students' leadership skills and potential.

Significance to LEAD division members: The focus of the John Lof Leadership Academy on engineering-specific leadership skills is aligned with recent research indicating that effective engineering leadership requires a unique set of competencies. By emphasizing these skills in its workshops and seminars, the JLLA is helping to prepare engineering professionals to succeed in leadership roles.

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