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Development of Assessable Leadership Experiences Outside of the Engineering Classroom

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Abstract

The challenge of providing leadership learning experiences is particularly challenging in an academic environment. The structure of a traditional classroom environment (built in reward system [grades], presence of an authority figure [professor] and very limited time frame) restrict the range of experiences that a developing leader may encounter and process. On the other hand, it is difficult to assess outcomes using external opportunities for developing leadership capacity because the opportunities (e.g. leading student clubs, honor societies, or ROTC) have significant structural differences. However, the challenges presented in such external opportunities, especially for leading volunteers in any organization, can provide significant learning opportunities that cannot be easily matched in a classroom.

This paper discusses the first year of developing a "laboratory" using external development opportunities and the structure used for assessing the leadership experiences for students in a focused engineering leadership class. While none of the leadership experiences are exactly the same, there are common elements of each experience. Specifically, the students must self-identify a volunteer (non-paying) organization in which they are engaged. They must clearly articulate the value of that organization in their lives. Further, the students must be able to identify at least one significant problem within the organization that they can address, plus articulate a vision for the organization after solving the problem. Finally, the students must develop an action plan for leading the change to solve the problem, including a defined communication strategy and what leadership styles and tools will be used (and how they will be used) to motivate the volunteers. To provide further experience and help provide value to the organizations, the students were organized into groups of four (cadres), such that each student could act as advisors to each other and assessors of progress for each team member, reporting specific metrics and general progress to the class professor on a weekly basis. This paper will present an overview of the program, a description of the roles and results, as well as lessons learned in helping provide tangible leadership experiences to developing engineering leaders.

Introduction

This paper discusses the details of in-progress effort to design and execute a practical and rigorous leadership experience for engineering students in a leadership development program. As outlined very well by Warnick et al. and Pitts et al., the use of experiential learning in leadership education for engineering students presents many logistical problems. [1,2] "Hands-on" learning requires significant investment in student and faculty time, faculty resources, and competes with theoretical coverage, other course resources, and time of the key stakeholders. Therefore, while laboratory (or hands-on) learning is a cornerstone of engineering education, it is a non-trivial challenge to successfully implement for engineering leadership education.

There are several documented examples of successful experiential models for engineering leadership development at Northeastern, MIT, Penn State, and Brigham Young. [1,2] The author highly encourages the reader of this paper to investigate those programs because the needs of the reader may be better served by those models. This paper presents a model that is built on a

greater degree of student led development (leadership), support, and accountability with a smaller degree of faculty-provided structure. The structure, challenges, and preliminary results of this effort are presented in this paper.

Background

While greater detail of the engineering leadership program at Ohio University are detailed elsewhere, the program is designed as a two semester experience, with the first being a focused seminar and the second semester applications and field experiences. [3] Most of the class consists of graduating seniors, selected through a process of application and interview in the prior Spring semester. The key requirement for application is demonstrated leadership experience with the greatest weight given to leadership of volunteer organizations.

The selected students are given summer readings and an assignment to evaluate critically aspects of the readings before the start of class. Examples of these readings range from Sample to Goleman. [4-8] These readings were assigned to assist the students in developing terminology, concepts, and framework of successful leadership. The summer readings are often the first time the students have critically considered concepts such as “competence,” “character,” “vision,” along with “knowing and dealing with self,” “continuously listening and learning from those around you,” “communicating and inspiring a shared vision with others,” and finally “enlisting, engaging and empowering followers.” This is considered the first step in team building (where the team is the class), because it gives them common terminology and information to share.

Building to the Capstone Experiential Leadership Exercise

The Capstone Experiential Leadership Exercise is the culmination of several activities and learning experiences. Unlike the models presented in Pitts et al. [1] and Warnick et al. [2], this model relies almost exclusively on external (to the class) opportunities for leadership either on campus or in local organizations. This is facilitated greatly because most of the students selected for the program already hold a leadership position in at least one organization. The Fall seminar is used to guide the students towards this capstone experience by developing the trust and communication necessary for integrated teamwork among the student leaders. This level of cooperation is a key element, as the students break into small groups (or cadres) to review, guide, and assess the aspects of leadership of each member of the group in their capstone effort.

The first key element in building cadre cohesiveness is a team building experience that is called the “Challenge Course,” offered by the Ohio University’s Outdoor Pursuits group. Held very early in the Fall seminar, this exercise involves physical challenges (such as moving the class from one platform to another) that require the students to cooperate for solving problems in a time-restricted environment. In these exercises, the students must decide to either lead or follow, depending on circumstances, to achieve the desired objective.

Students also share personal stories through a video autobiography of themselves. In addition to sharing their story, the autobiography is also the first of several assignments to help the students more fully understand themselves and their leadership styles. The value and benefit of each student telling their own story helps them start to understand the importance of “getting to know

themselves," relating to "emotional intelligence" and "understanding and dealing with self." This exercise also helps the instructor learn more about each student.

Students also spend significant time on development of emotional intelligence, with at least three behavior inventories (such as True Colors, Bolton, or Myers-Briggs Temperament Indicator test) and discuss the results in class. Building strong interpersonal skills requires the students to understand their own behavior pattern to recognize their own strengths and weaknesses. Also from this, they learn the styles of others and how these styles interact with their own personal style. This effort gives the student framework for the application of different leadership styles based on the personalities of their followers, as well as teach them why they make certain decisions. Note that while students may think this effort is repetitive at first (e.g. one inventory exercise is the same as another), if they are challenged to find the differences, they can critically understand the importance of each effort designed to help them learn more about themselves.

The team concept is further built through multiple class interviews of visiting leaders. While the teambuilding is important to the capstone project, the immediate goal during the Fall seminar is for the students to work together as a team in the interview of the visiting leader. It can be uncomfortable for students to ask probing and sometimes personal questions of noted leaders that might wind up being their boss's boss next year. Understanding that they are a team takes the pressure off the individual student, allows them to focus on learning and asking good questions, and helps with the overall class atmosphere. The team culture emphasizes that no one wants to be the weak link in the discussion, encouraging the participants to prepare thoroughly for each speaker so that they can make a relevant contribution.

As previously discussed, the focus of this paper is to discuss a new model for experiential leadership learning for engineering students. The next section describes the actual model starting with the founding objectives that the students must develop for the experience, the execution of the model, and the challenges that were faced.

Capstone Experience

The objectives of the Capstone Experience, as given to the students, were

1. Choose a "real-life" leadership opportunity in an organization that you have the greatest personal interest (passion) in addressing
2. Describe the leadership opportunity (including aspects the organizational structure)
3. Describe the problem(s) that you will or must address in this role
4. Envision the organization in your ideal outcome(s) and describe
5. Explain your vision for solving the problem(s) by developing specific objectives
6. Create a strategic plan for achieving your vision including
    a. Communication strategy
    b. Delegation and empowerment of your followers
    c. Timeline for completion of your objectives from #5
    d. Reflection and feedback (coaching) in your small group of other leaders
    e. Any other leadership aspect you plan to employ
7. Explain the metrics that you must attain/assess in order to meet your objectives from #5
8. Describe how you will hold your teammates (other leader) accountable for progress

The heart of the model is that the students address these objectives for the capstone leadership experience within a small group (a cadre of 3-5 students) while building the team environment throughout the semester seminar. The students initially described their leadership opportunity and why it is their "passion" to both their cadre and faculty instructor. This initial feedback given and questions asked by the cadre to each member is used by the individual student to refine the scope of the opportunity before presenting their final concept to the faculty instructor.

After the opportunity is vetted as possible, the students are asked to take three weeks to consider implementing their vision. Specifically, items 5, 6 and 7 (develop actionable items for solving the problem, create a strategic plan for meeting the objectives, and develop metrics to quantify your "success") were the focus of this phase of the experience. The work done by the individuals were then brought to the cadre for discussion.

Following that, the students were asked to begin execution of their plan. No review by the faculty was required, although several students met for mentoring before undertaking the effort. This phase culminated in a final cadre review for the Fall semester and report to the faculty instructor providing their revised answers to the eight objectives originally outlined. The program continued into the Spring, where students are meeting every other week to discuss progress and other issues outside of the framework of the seminar class.

Challenges

As discussed by Warnick et al., a fine line must be walked to provide a framework for the students to increase self-directed learning while avoiding the perception that they are doing all the work of the experience. [1] This was addressed by adopting a three-pronged approach. The first prong was to lay out the eight objectives of the project and the rationale behind them, as well as the steps that would be taken in meeting the milestones of preparing the students to fully launch their efforts by the end of the Fall semester. The second prong was faculty mentoring and feedback on the two milestone reports, providing not only guidance but support to enable the student's efforts. The third prong was the engagement of the cadre as a peer mentoring and accountability group.

The third prong was considered the key when the model was being developed. Because faculty time was limited, oversight of all the projects to the level considered necessary was almost impossible within the constraints of available faculty time. But more importantly, the students needed a support network of peers facing similar challenges (e.g. leading volunteer student organizations.) Besides being able to help with issues related to the leadership challenges, the cadre support network provided a greater level of accountability (they were in contact daily with their peers) and helped the students develop mentoring skills.

Another challenge was, in some cases, executing the strategic plan. Resources that students had considered available were not always readily at their disposal. This was the top problem listed by the students. While it was not always solved easily, the cadre concept was also very useful

here as well. The primary way students overcame resource problems was through sharing capacities with other organizations affiliated with the cadre or the class.

Results and Observations

Because this is a work in progress, quantifiable data for program success is unfortunately limited. However, anecdotal evidence indicates that student satisfaction with the process and preliminary results is high. The students gave very positive ratings to learning (from the capstone project) in areas related to conflict management, setting goals, communication strategies, and in personal (their) decision making. They also rated development of mentoring and networking extremely high. Less highly rated, but also noted was growth in the use of management tools (especially metrics) in attaining the leadership goals.

The most positive feedback, however, came from the fact that the students perceived that they were actually making a real difference in their organizations. The other most notable feedback was that almost all of the students felt that they gave good feedback to their peers and that their peers accepted their feedback. From that feedback, they (collectively) felt they were making a wider contribution to the common good than just their individual effort.

The last observation of the on-going effort was made by one of the students. "*I have really enjoyed this effort so far. And it has paid off, not just for <his organization>, but also in Senior Design. I'm really amazed at how similar the processes are. In SrD, we have to identify the problem, ask questions, narrow down the problem to its essence and brainstorm solutions, then devise a solution and make it work. Same here. It's really cool to see that*."

Conclusions

While it is far too early to declare this model a viable option for experiential leadership learning, it appears to have many positive attributes, especially stemming from peer-to-peer mentoring and support. There have been bumps, notably with lack of resources in executing student leadership plans. However, the students have shown remarkable resilience in helping each other overcome impediments.

For future efforts, a formal exit survey will be conducted and longitudinal data will be collected, as this model will be run again. The results will be used to attempt to improve the model and results will be disseminated for any engineering leadership development group that might wish to use aspects of the model in their educational efforts.

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