

Work in Progress: Expanding the Professional Formation of Engineers through a Cross-Cultural Communication Workshop for First-Year Students

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Abstract

This Work in Progress focuses on a local effort to embed cross-cultural awareness, knowledge, and skills into the professional formation of undergraduate engineering students. In particular, we will provide an overview of a cross-cultural communications workshop that was recently developed for implementation into two living-learning communities for engineering undergraduates at Virginia Tech. These living-learning communities were created to provide social and academic support for first-year female and male engineering students. Combined, these learning communities now support over 600 students, the majority of whom are enrolled in their first-year of college. This also includes a large support team of upperclassmen students (i.e., sophomores, juniors, and seniors) who serve as mentors and committee members.

Purpose

The work presented here is part of a multi-year plan to impact every student involved in either of the living-learning communities. In this paper, we describe the work to date, which includes our collaboration with faculty in the field of sociology to develop the workshop and assessment results from its initial implementation. We also describe our next steps, which will include implementing a training program for upperclassmen leaders. In addition to the cross-cultural communications workshop, we will develop four more workshops on other topics related to diversity. Each workshop module will be one hour long. Our long-term goal is to have the students in the learning communities trained at a basic level to recognize why an understanding about diversity issues and developing cross-cultural skills is critical for their success.

Introduction

Both the National Science Foundation (NSF) and the National Academy of Engineers (NAE) have encouraged better efforts from higher education institutions in using both formal and informal methods to revise curricula that focuses on the professional formation of engineers (Downey, 2014). One area of competence where students might benefit substantially pertains to their development of what administrators refer to as “professional” skills. This sentiment is also endorsed by a variety of corporate stakeholders across the engineering industry. For example, Dianne Chong, vice president of engineering, operations, and technology at the Boeing Company, expressed that while “most schools are doing an excellent job producing the technical skills that we need... employers want more than that” (Benderly, 2015). Therefore, our goal is to help students develop these additional skills desired by employers.

In addition to the work already being done in the living-learning communities to build the professional skillsets of student participants, we will expand our objectives in this category to focus on including skills related to diversity and inclusion. We believe that this new integration of diversity content will not only make our students more marketable as future engineers, but it will also enable them to make a more significant impact on the field of engineering.

Living Learning Community Structure

Learning communities have become one of the most commonly used strategies in efforts to promote active learning environments and increase student involvement on college campuses (Shapiro & Levine, 1999). Levine and Shapiro (2000) refer to them as “a variety of curricular approaches that enroll a common cohort of students in linked or clustered courses, often around an interdisciplinary theme” (p. 13). Many of these types of programs are geared toward first-year students, and include participation from upperclassmen peers who serve as advisors or mentors for the targeted cohort (Kellogg, 1999; Tinto, 2004; Turrentine, 2001). Tinto (2003) suggests that students who participate in residential or living-learning communities are often more engaged in classroom settings. They are also able to connect and collaborate with peers in similar disciplines by forming much needed support networks to lessen students’ feelings of social isolation due to the rigors of their particular major (Levine & Shapiro, 2000). Not only have these strategies proven to be effective tools for aiding in student retention, they are also useful for helping majority students address social justice issues affecting their peers who experience marginalization.

This work in progress focuses on two living-learning communities geared toward first-year engineering students. The first program was established for female engineering students in 2001, followed by a program for male engineering students in 2004. Both learning communities are currently housed in one residential hall with separate floors for females and males, in addition to one co-ed floor. Students initially commit to a one-year participation agreement with the learning communities followed by an opportunity to continue and or advance in various leadership positions throughout the remainder of their undergraduate careers. In the female living learning community we currently have 204 first year students and 89 upper class leaders. In the male community we have 279 first year students and 68 upper class leaders.

The first-year experience focuses on social support and academic skill development that help promote successful transitions from high school to college, as well as encouraging students to begin exploring possibilities for transitioning from college to career. This work is accomplished through a seminar course that includes assignments targeting college success skills, career exploration, and interaction with upperclassmen leaders through peer mentoring and community activities. The second-year experience includes a seminar course designed to provide students with leadership experiences through various types of committee involvement opportunities. Students serve on one of several committees that plan events for first-year students in the respective areas of academic support, K-12 STEM outreach, service-learning, professional development, social activities, and communications. By supporting first-year students these leaders continue to improve their own professional development and academic support skills. Some of these students also serve as mentors to small groups of first year-students that meet once a week for the first ten-weeks of the fall semester.

These courses are where work is being done to introduce professional development skills related to topics of diversity. The majority of students who return to the learning community beyond the second year serve on the Leadership Team that supports the second-year program. These student leaders help supervise the various committees and provide mentor training support.

Conceptual Frameworks

After reviewing multiple conceptual frames related to diversity, we chose two models that seemed most compatible with the objectives of the new curriculum featured in this work in progress. First, we examined Pope, Reynolds, and Mueller's (2004) multicultural competence (MC) theory. This model is structured in three parts and consists of multicultural awareness, multicultural knowledge, and multicultural skills. The MC frame coincided almost exactly with the new modules we plan to develop shown in Figure 1. Therefore, it emerged as the most appropriate model to use and became our primary framework.

Multicultural awareness focuses on an individual's understanding of their own social identities in comparison with the identities of members from other groups (Pope, Reynolds, & Mueller, 2004). The competency of awareness encourages students to engage in critical reflection about their own underlying assumptions to ensure that individuals with differing cultural perspectives are not invalidated. Multicultural knowledge focuses on the pursuit of cultural knowledge and the comprehension of new and or existing theories regarding race, class, and gender (Pope, Reynolds, & Mueller, 2004). This competency challenges students to educate themselves as much as possible about various cultural groups and any related sub-cultural nuances as strategies for successful organizational management. Multicultural skills places emphasis on an individual's ability to translate multicultural theory from the conceptual frame to real world practice (Pope, Reynolds, & Mueller, 2004). The skills competency is the quintessential stage of the entire model, because it affirms that students are able to recognize their own cultural biases, understand and critique relevant multicultural theory, and apply those concepts in a practical and meaningful way.

Second, we examined Edwards's (2006) social justice ally identity development model. This framework also consisted of three constructs: 1) aspiring ally for self-interest, 2) aspiring ally for altruism, and 3) ally for social justice. We chose to only integrate aspects from the third frame to provide theoretical support for our new curricular implementation, because this stage of ally identity development aligns more appropriately with our application of the MC model. Edwards's frame is predicated on the two key concepts of social justice and ally identity, both of which should be examined in detail to provide greater theoretical context (2006).

Social justice refers to changing or disrupting systems where members of a dominant social group receive unearned privileges at the expense and subjugation of members from other subordinate groups (McIntosh, 1988). According to Edwards (2006), members of the dominant group are often considered agents of oppressive systems, regardless of their awareness of those realities. However, they may also be disenfranchised by the very same systems they help to maintain. The term ally is defined as "a person in a dominant position of power working toward ending the system that gives power in the interest of a group with which one does not share a particular social identity" (Patel, 2011, p. 78). Therefore, it is incumbent that members of the dominant group work diligently to become allies for social justice. During this self-reflective process, individuals are required to engage in careful and critical thought, specifically as it pertains to their role in perpetuating systems of oppression (Edwards, 2006). Social justice allies must be committed to working with members of all groups and moving beyond the mere notion of achieving multicultural awareness and knowledge as milestone goals, as is the case for other competence models. Instead, they should strive toward dismantling systems that cause harm and

liberating themselves from those cycles (Bishop, 2002; Brod, 1987; Harro, 2000; Pope, Reynolds, & Mueller, 2004). For this reason, a revised version of Edwards's ally identity development model was used as a secondary frame.

Informed by these two conceptual models, this new curricular implementation provides us with an opportunity to make an impact on the majority students in the community who will, in time, be the co-workers, collaborators, staff and perhaps supervisors of their peer underrepresented engineers. While a large amount of work has been done with male faculty encouraging their understanding of their role in helping retain and recruit more female faculty in a more climate friendly environment (Bilen-Green, Carpenter, Doore, Green, Horton, Jellison, Latimer, & O'Neal, 2015), little work exists on encouraging majority students at the undergraduate level to serve as advocates for underrepresented students. We would like to create learning communities where these topics are explored and students are exposed to skills that help create change in the engineering community at large.

Strategic Planning and Curricular Design

To initiate the process of incorporating new diversity content, administrators from the living learning communities reached out to faculty from the sociology department during the fall of 2015 to solicit their expertise in human relations training. After several meetings with first-year seminar course instructors and student focus groups to discuss each program's goals, a multi-year plan was created to incorporate diversity skill-building within the curriculum. As shown in Figure 1, five modules were identified as encompassing topics that will be developed and delivered to participants over a sequential three-year period. Topics were selected that were mutually agreed upon as being imperative to the professional development of engineering students in the living-learning community.

To adequately prepare instructors for facilitating these workshops, faculty partners from the sociology department provided training information during the spring of 2015. The training included information about the overall workshop facilitation plan, as well as best practices for stimulating engaging conversations around diversity related topics. Further materials were provided to help develop Module 1 into a workshop format.

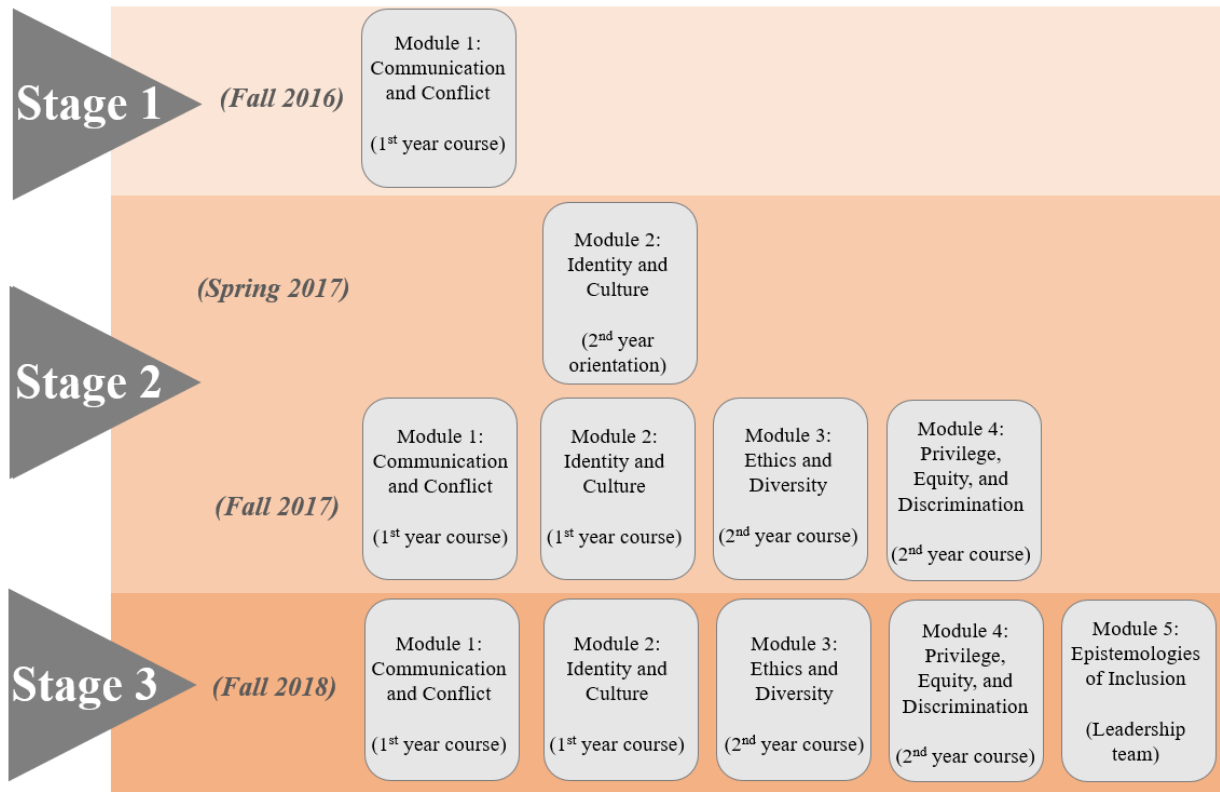


Figure 1. Working collaboratively with faculty from the Department of Sociology, five modules of training for the two living-learning communities were developed. These modules will be implemented in three-year stages for participants in the engineering living-learning communities.

Implementation

The first workshop entitled “Cross-cultural Communications” was delivered to the first-year participants during the fall of 2016 in a one hour session. This workshop focused on the topic of communication and conflict, as suggested in Figure 1. In attempting to prioritize participants’ level of comfort prior to the workshop, students were asked to indicate their preference for participating in either a single-gender or a co-ed workshop. Although most students chose to engage in a co-ed workshop environment, all student preferences were accommodated.

Workshops were co-facilitated by members of the first-year seminar instructor team along with members of the campus-wide intercultural communication center. The workshops were offered at multiple dates and times to ensure that all first-year students in the community were able to participate.

The first workshop contained content on high- and low-context communication. Examples of high-context communication were discussed with students, which is typically exemplified by story-telling or an individual’s inclusion of the “how” and “why” something occurs. In contrast, low-context communication examples included discrete details and basic facts. Workshop facilitators encouraged students to consider and explore cultural preferences for high- or low-context communication. Consequently, students were asked to reflect on the how cultural communication-style preferences might impact team environments in the engineering work

force. Similarly, high- and low-authority communication styles, also known as power distance, were discussed with students.

The majority of workshop time was devoted to group discussion on various case scenarios pertaining to cross-cultural communication. Each workshop group consisted of roughly 30 -40 students. Students were then divided into groups of six to eight members for discussion. Then, each group was given a different case scenario to discuss, dissect, and analyze. After small-group members were given time to discuss a scenario with one another, representatives from each group took turns presenting their thoughts to the entire workshop group. Case scenarios were developed by the first-year seminar instructor team. Some of them were based off of actual events that occurred at the institution where the living-learning communities were located, while others were modeled after resources that were associated with cross-cultural communication.

Results

Assessment of the first workshop module is currently in progress. This includes two primary forms of evaluation: surveys and focus-groups. Survey data collection has been completed, and focus group data collection will conclude in March 2017. The following section will highlight preliminary assessment results, focusing on data collected from surveys. First, survey data was collected from 86 students immediately following workshop participation. These surveys included five Likert-scale question items aimed to understand students' attitudes and perceptions surrounding program effectiveness, as well as two open-ended question items to understand the impact of program content on participants. Table 1 displays the survey items.

Table 1. Survey prompts for feedback on the Cross-cultural Communication Workshop

| <i>Survey Item</i> | <i>Scale</i> |
|---|--------------|
| <i>The program was organized.</i> | Likert Scale |
| <i>The objective of the program was clear.</i> | Likert Scale |
| <i>The presenters were effective.</i> | Likert Scale |
| <i>The ideas were presented well.</i> | Likert Scale |
| <i>The program met my expectations.</i> | Likert Scale |
| <i>Which aspects of the program had the most impact on you?</i> | Open-ended |
| <i>Which aspects of the program need improvement?</i> | Open-ended |

Quantitative data from post-workshop surveys is summarized in Figure 2. Generally, students reported that the program met their expectations and that ideas were presented well. Feedback from students also suggested that in the future, the objective of the program should be articulated more explicitly.

Qualitative data from open-ended survey items was analyzed using Braun and Clarke's (2008) recommendations for thematic analysis. The six-step process for thematic analysis of qualitative data includes: 1) become familiar with data, 2) generate initial codes, 3) search for themes, 4) review themes, 5) define and name themes, and 6) produce report. The following sections highlight central emergent themes in student responses to open-ended survey items.

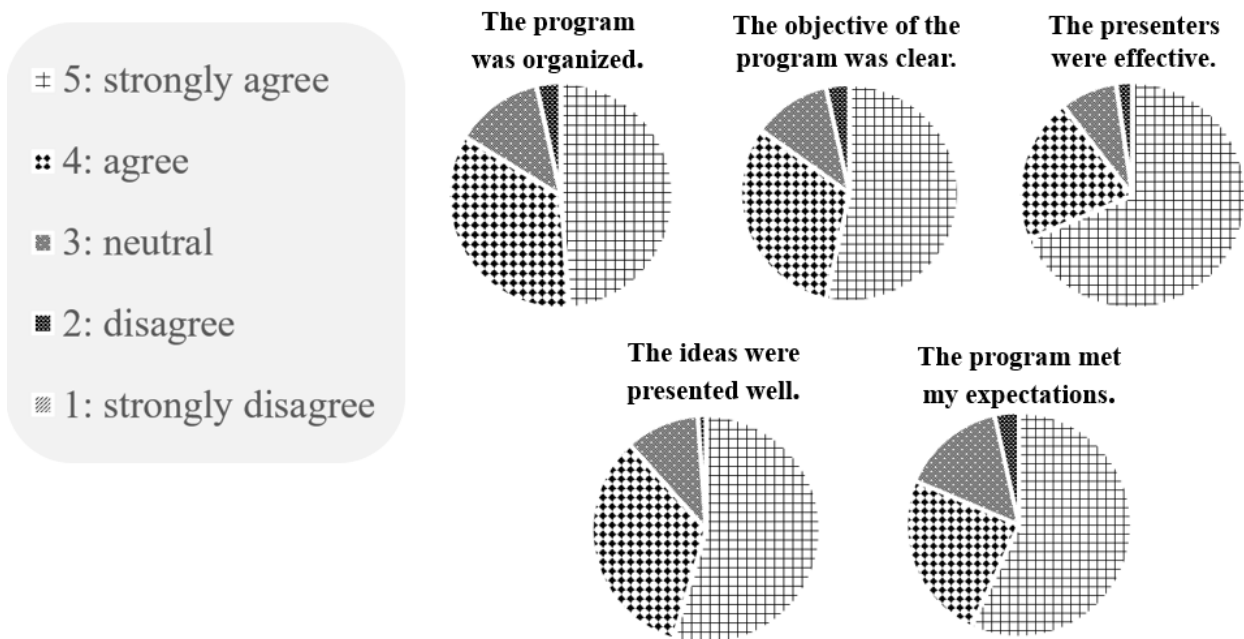


Figure 2. Quantitative data from post-workshop feedback surveys

Students’ reflections on workshop impact. To understand the impact of the workshop on students, students were asked to reflect on which aspects of the workshop had the most impact on them. By far, the most common theme in students’ responses was an appreciation for the case scenario group discussion activity, which allowed students to engage with each other in small groups of six to eight people. Students noted that this activity sparked the sharing of ideas, ultimately resulting in a shift of conceptions about communication across cultures. Regarding the most impactful aspects of the workshop, one student reflected that the most meaningful workshop experience was “hear[ing] stories and perspectives from multiple people.” Another student noted that the group discussion activity “provided ideas” for communicating across cultures and working in various professional environments. Some students even credited the case scenario group-discussion activity with helping them solve problems more effectively, a skill often embedded in the identity of an engineer. Interestingly, one student articulated they particularly appreciated the discussion format of the case scenario activity by pointing out how different the environment is from a typical lecture-style classroom setting. Together, these findings suggest that case scenarios may be an effective tool for encouraging peer-to-peer dialogue on topics such as cross-cultural communication.

Another prevalent theme in student responses was a newfound appreciation for understanding various styles of communication, a central topic covered in the workshop. Students most often reflected on the communication styles of *high-* and *low-context communication*, including identifying where they personally fit on the high-/low-context communication spectrum as well as how their own communication style affects their interactions with other people. Interestingly, students reflected on high-/low-context communication as being valuable to their professional development as engineers. For example, one student reflected, “the [workshop] aspects of high

and low context communication impacted me the most because I learned about the different communication styles I will have to adapt to as an engineer.” Another student noted that the most thought-provoking aspect of the workshop was “understanding the need of communication styles to become a successful engineer.” Given the objective of this workshop, which was to enhance the professional development of first-year participants in the engineering living-learning communities, these results are promising for the programs’ future development and improvement of the workshops.

Perhaps the most salient theme that emerged from student responses are reflections on respect and the importance of respecting persons with different backgrounds. Due to the potentially sensitive nature of workshop discussion topics, facilitators of the workshops began with a brief, but powerful, discussion on principles of civility and respect. Several students responded that this introductory discussion on respect was “the most insightful piece” of the workshop. Another student noted that, because of the workshop experience, he had begun to respect “how diversity matters;” and yet one more student said, he gained “respect of different people’s perspectives.” These findings suggest that students are open and eager to engage in discussions with peers from diverse backgrounds, and furthermore, that these discussions may have profound impact on student development.

Students’ reflections on improving workshop for future. Students provided particularly useful ideas for improving future iterations of the Cross-cultural Communication workshop. Specifically, students noted that a longer workshop may be needed in order to adequately cover all workshop content. Similarly, several students reported that they would have enjoyed digging deeper into the case study discussions, but time did not allow. In the future, it is important to consider how to best structure workshop activities to allow students ample time to explore, engage in, and benefit from group discussions.

One resounding theme in student responses was a push for engagement of all students in the workshop environment. One student noted that, at times it was difficult to “[get] people involved in the discussion;” while another student noted that they would have benefitted more from the workshop if the facilitators had encouraged “everyone to talk more and not just the same few people.” On a similar note, several students articulated that deeper engagement from all students might be better facilitated by smaller discussion groups. In one particularly insightful response, a student reflected that “people feel more comfortable participating in small groups” and recommended that facilitators should consider small-group discussions in the future, hoping that such environments might lead to “richer discussions.”

Qualitative feedback: focus-groups. To seek an in-depth understanding of students’ experiences in the first implementation of the cross-cultural communication workshop, focus-groups will be conducted with members of the first-year living-learning community. Target participation for focus-groups is 100 students. Focus-groups will be led by the instructor team for the first-year living-learning communities. In an effort to solicit honest feedback, no student will be paired with their own course instructor, allowing for anonymity of student feedback. Focus-groups will include questions about the overall workshop experience, activities and topics that were most impactful, and suggestions for future workshops. Focus-groups will also explore how, or if, students connect content from the workshops as relevant to their professional development as

engineers. All of the evaluation work done for this project falls under the IRB approval for the office supporting the engineering living-learning communities.

Plans for Future Practice

This spring, work will be done to deliver module 2 to our rising second-year students. We will deliver the content at the spring training for their role as leaders in the living-learning communities. The workshop will not only focus on the content of Identity and Culture, but will focus on idea generation for how they can create content for the events they lead for the learning communities in the fall. Giving the student leaders the responsibility and opportunity to reflect on the content they have received and pass their knowledge on to others. Creating an environment where students take control of the information they have received and giving them the role of passing that knowledge on to their mentees and other first-year students will be critical to the success of this plan.

By the fall of 2017, the first-year and second-year students will be on a schedule that ensures that all students will receive the first four modules in the plan. We will continue to evaluate each workshop module that is offered to improve the pedagogy of the newly implemented curriculum.

In the fall of 2018, we will have completed implementing the plan and will have a leadership team consisting of third-year and fourth-year students that have received all five modules. This group of students will allow us to collect longitudinal data surrounding the skills they learned related to the new diversity content and their impact on student outcomes such as job placement.

Conclusion

We will continue working with our partners in the sociology department as well as our corporate partners who have expressed interest in the work we are doing. Many of our corporate partners have content similar to the planned modules, which they use for their own internal staff development and are willing to share with our students. These partners facilitate trainings for our upperclassmen leaders during their course meeting times, which occurs either in-person or via web conferences. We will continue to enlist their help in developing future modules and delivering content whenever their schedule allows. Having this type of support from industry partners gives validity to our efforts to make diversity competence a marketable skillset for our engineering students.

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