



Re-envisioning the Role of the Engineering Education Chapter at a Research-I Institution: Lessons from a Cross-disciplinary Model

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Abstract

Engineering Education Chapters at academic institutions are largely student-led, confined to engineering disciplines, and broadly aimed at promoting engineering and engineering education. Research and dissemination, and participation from faculty, staff, and non-engineering students and academic units in chapter activities are generally limited. In this paper, we describe a cross-college model of an ASEE chapter that includes an interdisciplinary network of faculty, staff, and students across colleges of engineering and education in a large Research I institution. The chapter consists of five working groups: (1) K-12 engineering education, (2) undergraduate engineering education, (3) graduate engineering education, and (4) diversity and inclusion in engineering, and (5) research and dissemination. Using a bottom-up model, the working groups drive the mission of the overall chapter and an executive committee enables implementation and evaluation of initiatives proposed by working groups. To better understand and define the role of engineering education chapters at comprehensive research institutions, we report preliminary results on programs proposed by each working group as well as a scoping review of impact and role of existing active and dormant chapters. This work will identify gaps and opportunities that engineering education chapters can address, including but not limited to, supporting and enriching the academic experience of engineering students.

Introduction

The first American Society for Engineering Education (ASEE) student chapter was founded in 1993 at Purdue University. Since this inaugural chapter, many universities, as well as a few community colleges, have followed by forming their own ASEE student chapters. To date, there are a total of 19 active chapters and 15 dormant chapters [1]. ASEE chapters are generally focused on providing students with an avenue into the engineering education community and encouraging students to become more active and engaged at all levels of engineering education. Based on the ASEE website [1], the national mission statement and goals for student chapters fall into three overarching areas: (1) supporting teaching practices and outreach at the college and pre-college level, (2) support and encourage undergraduate and graduate students in their educational endeavors, scholarship and advancement in academic career, and (3) promote diversity and inclusion among underrepresented groups in engineering.

As chapters are dependent on student interest, time and resources, most student chapters take on goals in one, or possibly two, of these overarching areas. The structure of the chapter and its events center around that chosen area [2], [3]. For example, the ASEE student chapter at the Ohio State University, due to member interest, shifted its focus from graduate and undergraduate support to K-12 outreach. Based on this shift, the chapter's structure changed by expanding several officers' roles to be more outreach focused and forming new committees to stabilize the work [3]. Like most student-driven communities, this example demonstrates how closely tied a chapter's membership, interest, purpose, and structure are related.

In order for chapters to have a broad and meaningful impact on engineering education at the university level and in the local community, chapters will benefit from broader involvement from administrators, faculty, staff, and community members from multiple disciplines. When looking across the active and dormant chapters, the majority of members are engineering students. In addition to the narrow range in membership, the majority of chapters appear to focus first on supporting and encouraging undergraduate and graduate students in their educational endeavors, and second, on supporting teaching practices and outreach at the college and pre-college level. Few chapters seem to focus on or promote diversity and inclusion of underrepresented groups. This seems reasonable because supporting and encourage undergraduate and graduate engineering students is within the realm and experience of engineering colleges. On the other hand, teaching expertise, especially at the K-12 level and the promotion of diversity, equity, and inclusion are likely to fall outside of expertise of engineering colleges and staff making it more difficult and less of a priority for many ASEE chapters.

Multidisciplinary Approach. If chapters are to have a significant and broad impact within their community, we believe it is beneficial to partner or collaborate with other disciplines to tackle these goals. For the purpose of this paper, multidisciplinary or cross-disciplinary activities are used interchangeable to refer to activities that include a broad range of stakeholders, including practitioners and the public that cannot be satisfactorily addressed using single method or approach [4]. Multidisciplinary and interdisciplinary approaches in engineering education have been shown to benefit students in learning to: (1) work effectively with people who are from different disciplinary backgrounds, and (2) understand and appreciate how the nature of knowledge from other academic disciplines, especially when the disciplines are fundamentally different, can affect collaboration and problem solving [5], [6]. This multidisciplinary approach is highly valued by the National Science Foundation (NSF), who emphasize that successful research proposals will most likely be comprised of multidisciplinary teams of engineering and other fields that bring expertise pertinent to learning research [6], [7]. While multidisciplinary approaches are shown to benefit student learning and research in engineering education, it is important to note that this approach faces a number of obstacles such as cultural issues within departments, lack of credit for faculty in pursuing such objectives, already high teaching loads, and silos between disciplines [4]. The University of Arizona's ASEE chapter acknowledges these barriers, but we believe that the benefits of a multidisciplinary approach will help us reach the fullest potential and have the greatest impact at the university and community level.

University of Arizona Student Chapter. Here, at the University of Arizona, the ASEE chapter was formed on an interdisciplinary model that includes a network of faculty, staff, and students from several disciplines across the university. The purpose of this cross-college, interdisciplinary approach is to promote engineering education at all levels. The mission of the ASEE Chapter at University of Arizona are as follows:

1. To encourage collaboration between engineering undergraduate and graduate students through service, research, and professional development opportunities
2. To encourage and prepare engineering graduate students to pursue careers in academia

3. To increase awareness and understanding of societal, ethical, and public policy aspects and issues pertinent to engineering practice and education (this includes diversity and inclusion)
4. To promote collaboration between faculty, staff, and students across engineering and other relevant disciplines through research and outreach in engineering education.

To accomplish these goals, ASEE includes a bottom-up model in which individual working groups within the chapter drive the mission of the chapter and an executive committee enables implementation and evaluation of initiatives proposed by working groups. The chapter aims to effectively tackle goals related to undergraduate and graduate students, supporting teaching practices and outreach at the college and pre-college level and promoting diversity, equity, and inclusion. Due to the wide-range and inclusive elements of a cross-college chapter, the bottom up model works in a decentralized manner where the working groups function in a modular fashion. A modular organizational structure refers to an institution or association that can be separated and recombined to work more efficiently [8]. This modular approach allows the chapter to maximize its impact by working on several initiatives and valuing each members' voice and interest. While several chapters have taken a similar bottom-up model [3], no chapters, to our knowledge, have attempted to build from its foundation, a cross-college, interdisciplinary, bottom-up approach.

The objectives of this work are: (1) to conduct an evaluation the current status, focus areas, and impact of existing ASEE chapters, both active and dormant; (2) to describe the structure, progress, and lessons learned from the first year developing this cross-college model of an ASEE student chapter that includes an interdisciplinary network of faculty, staff, and students across colleges of engineering and education in a large Research I institution; and (3) to critically evaluate the chapter's goals and structure and provide general recommendations for all ASEE chapters

Methods

Participants. The participants in our pilot evaluation study include a collection of 16 ASEE chapters. Table 2 below shows a breakdown of the participants and how they were contacted.

Data Collection and Analysis. Evaluation data were collected in two ways: (1) semi-structured interviews, and (2) review of chapter websites to determine the overall mission of their chapter and their published activities in terms of working toward K-12 education, undergraduate & graduate engineering education, and/or teaching. Semi-structured interviews were conducted via phone or email with student and faculty contacts listed on the chapter website. Both active and dormant chapters were included in the review. All participants were provided the same set of questions (see Figure 1); however, not all participants chose to answer the questions as provided and some chose to focus on other topics and advice. The structure of the interviews was maintained as semi-structure in order to allow interviewees the opportunity to direct the conversation and emphasize those questions that they thought were valuable in guiding a new chapter.

Interview Questions
<ol style="list-style-type: none"> 1. How many years has your chapter been active? Has it ever been dormant? 2. What would you say are the top priorities/foci for your chapter this year? Overall? 3. What would you say are the chief accomplishments of your chapter this past year? Overall? 4. Is your membership largely composed of undergraduate or graduate students or is there proportional representation? 5. Is your membership largely composed of engineering students or are other majors (i.e., educational studies, etc.) well represented? 6. Does your chapter have any active collaborations with other organizations, structures, or groups within or outside your university? If so, what is the nature of those collaborations? 7. To what extent are faculty involved in your student chapter? 8. Is there anything else we should know about your chapter and its operations that might help our young chapter grow? Tips, pitfalls, challenges, and anything else are appreciated.

Figure 1. Interview questions provided to ASEE chapter representatives (both faculty and students).

Of the thirty chapters contacted, sixteen (shown in Table 1) had representatives respond to the call for participation. Participating chapters included both active and dormant chapters and chapters with founding dates ranging from 1993 to 2016. Findings are reported as common themes extracted from responses.

Table 1. ASEE Student Chapter Study Participants. Chapters are organized into ASEE Zones and are classified according to the Carnegie Classification System

ASEE Student Chapter Study Participants			
Zone I	Zone II	Zone III	Zone IV
Tufts University ^a	Purdue University ^a	Iowa State University ^a	Stanford University ^a
Syracuse University ^a	University of Michigan ^a	Texas Tech University ^a	Oregon State University ^a
	Georgia Institute of Technology ^a	Austin Community College ^c	Washington State University ^a
	University of Central Florida ^a		University of Washington ^a
	Tuskegee University ^c		Utah State University ^b
	Ohio Northern University ^d		
^a R1 Doctoral University ^b R2 Doctoral University ^c M3 Master's University ^d Baccalaureate College: Diverse Fields ^e Associate's College: Mixed Transfer/Career & Technical-High Nontraditional			

Data collected during the interviews were coded using thematic analysis [8] of the responses from the chapter representatives. In this thematic analysis, data from the interviews were analyzed separately for each participant and then in parallel to look for similarities and differences and establish consistency. Keywords or phrases were identified and then categorized into overarching themes. The final themes were categorized into five groups that are explained in the findings section below.

Findings

Theme 1: Strong student interest must drive the organization. Although chapters reported many differences in their specific model structure, a nearly universal belief amongst chapter representatives was the importance of strong student interest in maintaining a chapter year-to-year and accomplishing the missions of the chapter. Faculty advisors at dormant chapters reported that the primary reason for dormancy was lack of student interest. Students and faculty at active chapters reported that in order to maintain and drive this strong student interest, the chapter must adapt its goals and foci to match student interest. For some chapters, this meant moving their chapter's mission towards outreach in K-12. For others, this meant targeting professional development for graduate engineering students around teaching. As variable as the responses were, nearly all reported that student recruitment and interest are one of the most key ingredients to keeping a chapter alive and maintaining its mission.

Theme 2: An appropriate amount of faculty participation is key to long-term success. Many active chapters acknowledged the importance of faculty advisor participation for helping maintain a sense of continuity and for re-framing the goals of the chapter so that this student interest could be maintained. However, many faculty advisors and students commented on the importance of student autonomy in directing the mission and work of the chapter (as described in Theme 1). One area where faculty are especially important in helping a chapter is in finding funding for the chapter as funding situations and student-run fundraisers cannot always allow for execution of the chapter's mission.

Theme 3: Graduate engineering students are more often involved in these organizations. Although representation from undergraduate students and from majors outside of engineering were occasionally reported by chapter representatives, the majority of chapters are targeted toward and run by engineering students. One representative hazarded that the lack of undergraduates was primarily due to the name and goals of ASEE, stating that many individuals in the undergraduate phase of their career are not as interested in engineering education as they are in industry careers.

Theme 4: The ASEE chapter must differentiate itself from other organizations and the opportunities that they offer. Although the specific mission of each chapter varied greatly, many reported (both on their websites and in answering questions) that their work was targeted at offering opportunities that students could not find in other chapters. Many times, this work had to do with K-12 engineering programs and outreach and on increasing diversity in STEM through programs at all levels of engineering education. Another common focus of chapters' work included preparation of graduate students for careers in academia, including preparing teaching portfolios and applying for teaching professions. For many of the chapters, however, the

majority of their work seemed targeted in one particular topic area (which also served to attract certain students to be members).

Theme 5: Collaboration is present, but not essential to many chapters. Many chapters reported active collaborations with institutional centers or institutes (sometimes a specific PhD program and other times a less formal center with which chapters work with). Other chapters reported collaborations with honors societies, with neighboring universities, and with an organization that shared some part of their mission or work. In many cases, however, representatives reported that their work was primarily driven and carried out by chapter members.

The next section will illustrate and explain the structure and progress of our student chapter. The discussion section will then use these findings above to examine structure and goals of our chapter.

The ASEE Chapter at the University of Arizona Chapter: Current and Emerging Initiatives

Since its commencement in the Fall of 2017, the University of Arizona's ASEE Chapter has strived for a cross-college model to foster a multidisciplinary and inclusive culture at all levels of engineering education. By bringing together College of Engineering and College of Education, the ASEE Chapter has built an organization that works from the ground up. The chapter consists of five working groups: (1) K-12 engineering education, (2) undergraduate engineering education, (3) graduate engineering education, (4) diversity and inclusion in engineering, and (5) research and dissemination. With the bottom-up model, the working groups drive the overall mission of the chapter by designing initiatives centered around the working group's focus. An executive committee enables implementation and evaluation of these initiatives proposed by working groups. Within the ASEE Chapter group, membership and participation include an interdisciplinary network of faculty, staff, and students across colleges of engineering and education at the University of Arizona, a large Research I institution. For the first year, the overarching goal of the chapters was to better understand and define the role of engineering education chapters at comprehensive research institutions and to provide pilot models of initiatives that engineering education chapters can implement.

After a few weeks from the chapters inception, the following structure was established in Figure 2 and 3:

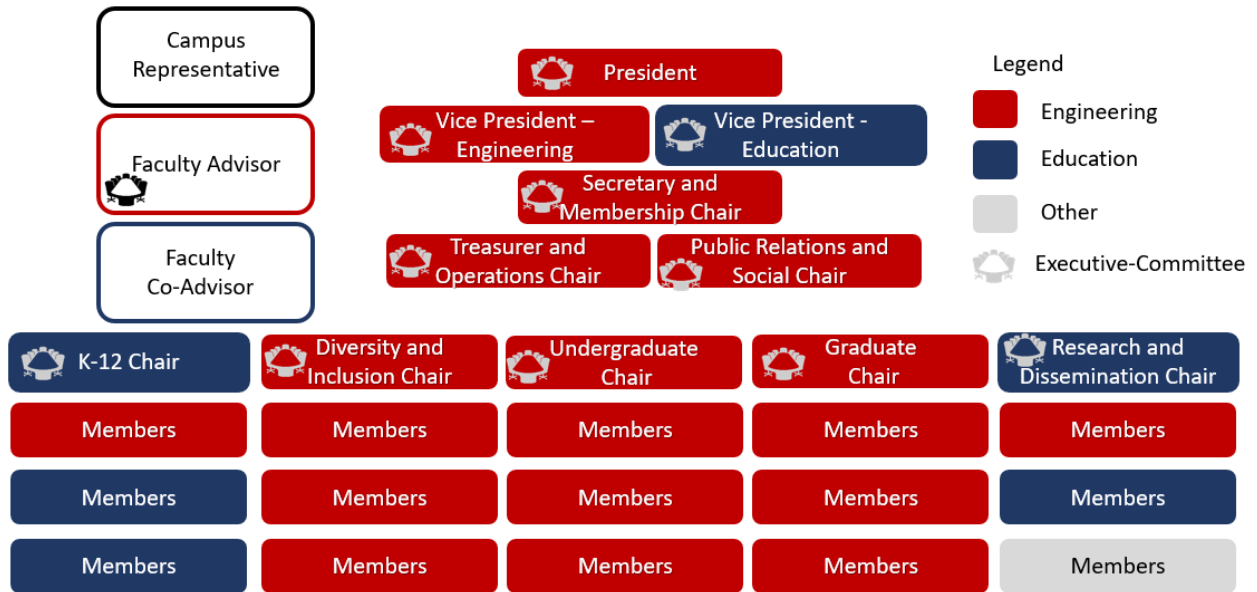


Figure 2. Graphical Representation of the ASEE Chapter Hierarchy.

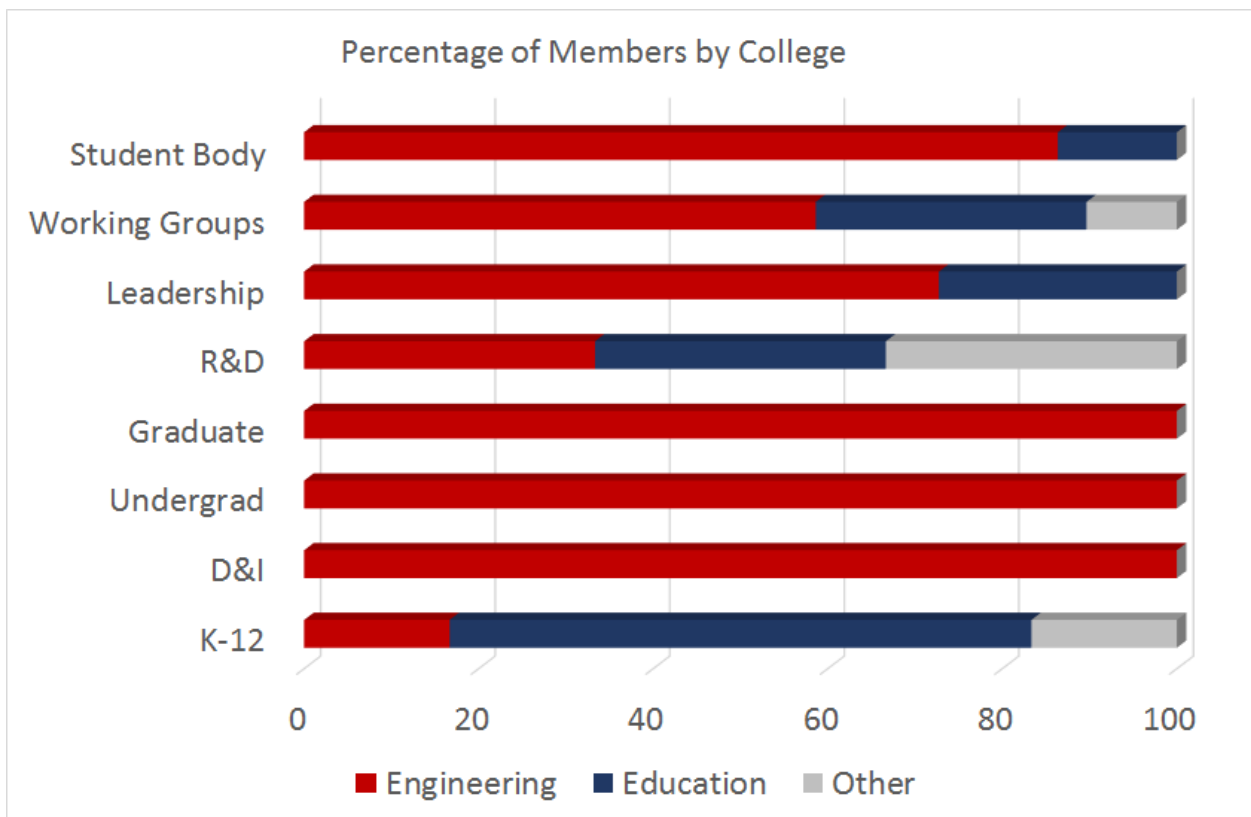


Figure 3. Percentage of Members in the ASEE Chapter by College.

The chapter recruited both undergraduate and graduate students for leadership roles, from both the College of Engineering and College of Education. Different departments within the two colleges were also sought after to allow for diversity among disciplines. In the spirit of diversity and inclusion, all groups pursued having members and leaders with diverse backgrounds. With such variety, the goals of each working groups, which is defined internally, is based on their human resources and motivation to help fellow students on campus and outreach to K-12. However, this is not to say that the organization has fully independent working groups. Executive committee (ex-com) meetings allow for collaboration on initiatives once a month allowing the entire chapter to be on the same page. All chairs are required to attend the ex-com meetings with an open invitation out to members.

After just a year of being formed, the various groups have had differing amounts of headway in terms of creating a sound foundation and having specific goals for the near future. In the next sections, the development and progress of each working group in the University of Arizona Chapter is reported. Specifically, each groups progress describes the working groups' goals, the collaboration within the working groups, the extent of implementation of the bottom-up approach, and any progress towards the defined goals, along with the intended impact on the current and future generation of higher education and K-12 students.

K-12 Engineering Education Working Group. With a total of eight members (three from the College of Engineering and five from the College of Education), the overall goal of the K-12 working group is to connect pre-college engineering outreach at the University of Arizona with the local K-12 education community, which includes schools and informal education programs. To accomplish this task, the working group set three sub-goals. First, they set out to identify and compile a list of current resources for K-12 engineering outreach efforts. Second, they reached out to educators, administrators, and informal program directors to identify their needs and to find out what these different stakeholders at the University felt would be the best way to support their efforts to teach engineering. Third, the working group aims to use this information to create opportunities, via an online platform or face-to-face event, to help connect engineering outreach with K-12 educators.

Over the Fall 2018 semester, the K-12 group has started gathering information from the university and K-12 educators on current status, scope, and need for precollege engineering outreach. To collect this data, three online surveys were created. The first survey was used to reach out to all University clubs and organization who might offer K-12 outreach, ask about the type of K-12 outreach the club or organization offers, the scope of the outreach, and how the club or organization can support the upcoming students. To date, the working group has collected information from five clubs and organizations. The second survey focused on K-12 educators and was sent out to local school districts and educator groups in the area. In this survey, the working group asked about the best way to support the schools' engineering and STEM education endeavors. The working group has currently collected data from 60 teachers and administrators and has started analyzing the data. Finally, the K-12 working group has created a Principal Investigator survey which is used to gather data from University of Arizona engineering professors to find out if they have a grant with a K-12 outreach component and to ask how K-12 members can support them. They currently have data from seven principal investigators.

Diversity and Inclusion in Engineering Working Group. With a core of five students, the goals of the Diversity and Inclusion (D&I) Working Group are focused on four main areas. First, the D&I is striving to develop and implement support structures for target groups of diverse undergraduate and graduate students within the College of Engineering and Education. Also, the D&I has the goal to further integrate the value of empathy through principles of humanities, social justice, and social responsibility in all levels of engineering training. Third, the D&I seeks to disseminate valuable ideas and research regarding D&I and STEM integration at the ASEE level and beyond. Last, the D&I members are working to help spark an interest in students at K-12 level from diverse backgrounds to pursue a career in engineering.

The members have been working with a number of groups throughout the Colleges of Engineering and Education to try to achieve their goals. During Fall of 2018, D&I collaborated with students and faculty from various areas around campus. So far, this includes the Disability and Psychoeducational Studies Department in the College of Education, the Diversity and Inclusive Excellence Committee at the College of Engineering, the Out in STEM (oSTEM) club operating at the LGBTQ Affairs Center, the director of the Office of Student Affairs, and the director of the Women in Science and Engineering Program. The D&I team has also developed a workshop on Intersectionality in Engineering targeted at University of Arizona students, faculty, and staff to increase awareness and understanding of the various identities people hold and how those identities come to play in an engineering context. In addition, the working group has a manuscript focused on engineering students with disabilities titled "Beyond Ramps and Signs: Rethinking Support Structures for Engineering Students with Disabilities" [11]. With the initiatives being developed and implemented, the D&I working group has the capability to help members of minority groups become more included at the University.

Undergraduate Engineering Education Working Group. As with most newly formed organizations, there are areas that sometimes face more challenges than others do. The undergraduate working group was one of those areas that unfortunately had a series of events that lead to roadblocks in their growth and development. The main challenge seen was a lack of time commitment from the students in this working group. In particular, the chair of the working group was not motivated to push for initiative or contribute to the growth of the chapter. However, the working group of three members was still able to begin to build a foundation for future members to get involved. The goals of the working group were proposed to inform and connect students to research opportunities, help students connect with learning opportunities, and provide more interaction between students and faculty. With the gap between faculty and students, this chapter has the potential to narrow that gap and help students have a higher quality education at this Research I Institution.

Graduate Engineering Education Working Group. With a working group of five individuals, the graduate working group has one main goal for the near future: to provide a more straightforward path to becoming a faculty member in higher education. The group would like to develop a certificate for preparing future faculty (PFF) in engineering and higher education, which has been proposed begin in Fall 2018. The certificate will have a student-faculty mentor relationship along with five workshops that will help PhD students grow as potential faculty

candidates. The workshops will be open to the University of Arizona community but will be required by the PFF candidates.

There is not as much academic diversity in terms of departments in this group. The members are all from the College of Engineering, but there is a desire to expand into the College of Education. In terms of idea and initiative generation, the PFF Certificate was initiated by the faculty mentor of the chapter, while the majority of the content was generated by the working group. In Spring 2018, two of the five workshops will be piloted. By helping graduate students see the whole picture of what it means to be in an academic career, this working group aims to support graduating PhD students develop the skills and knowledge need to have a well-rounded impact on the academic world. For this working group's initiatives to be successful, encouraging faculty participation is paramount to the program's success, and will be the core of the PFF Certificate.

Research and Dissemination Working Group. The main goals of the R&D working group are to search for potential publication/dissemination outlets and topics (at the local level and beyond) and to strengthen collaboration between engineering and education faculty and students as far as research goals (such as how a working group can facilitate research collaborations). The collaboration is cross-disciplinary. The members of the working group include individuals from Engineering, Education, and Family Studies and Human Development

The chair of the working group usually generates ideas and facilitates meetings between the working group members and the faculty member(s). Specific ideas for writing and organizing abstracts come from the group members as well as the chair. This group has meetings scheduled for the spring semester to divide work among members based on their preferred contribution. The group aims to explore the university's online profiles for people doing work that aligns with the chapter.

Lessons Learned from the Startup

The lessons learned from our first year as a ASEE student chapter fall into three main categories: (1) time and focus, (2) communication and collaboration, and (3) membership, recruitment and retention.

After the first year, it seems that the bottom up, modular approach has been effective for several working groups. These working groups have achieved success due to a dedicated chair and active membership that meets regularly. While we have seen great success in achieving a few initiatives and working across colleges to accomplish goals for engineering education, many of the working groups have seen slower start up times than expected and faced challenges with participation. Three of the five of the working groups have learned that their objectives have taken more time than expected as it can be challenging for members to find time on top of their classes, work, family, and other obligations. We believe that too many working groups, at least in the first year, could spread the chapter too thin.

In terms of communication and collaboration with organizations across campus, working groups have also learned that getting student or faculty involvement and response is challenging.

Repeated efforts and perseverance were needed to get people to complete surveys or questionnaires or attend workshops. We learned that we must find the new avenues for reaching out and develop new contacts from other colleges and student organizations across the University. Communication between the college of engineering and education as well as the numerous departments within each college can be very challenging. For our chapter, we are pushing for collaboration across the colleges, but this cross-college connection has not been essential to some of the working groups or their goals at this time.

In terms of membership, recruitment and retention, the working groups, in particular the Undergraduate, Graduate and D&I working groups, would likely find new ways to recruit and retain new members from both colleges to get more academic diversity. In particular, graduate engineering students are more often involved in these organizations, which reaffirms our findings from other student chapters. In particular, the K-12 WG, which presents the potential for the cross-college collaboration, has found it difficult to recruit and retain members from the College of Education who are specifically dedicated to K-12 engineering education. The group hopes to hold more recruitment and activity sessions for education majors.

Discussion

In this paper, we considered a cross-college, bottom-up model of an ASEE student chapter targeted toward improving all facets of engineering education from K-12 through graduate education and faculty development. Our findings support this model are organized here according to the themes identified in our review of national ASEE chapters.

Theme 1: Strong student interest must drive the organization

National chapters identified the importance of student interest in driving execution of organizational mission. The bottom-up nature and the modular structure of this ASEE model allows for this sort of student interest to be cultivated. While other chapters have strong bottom-up models where students are actively involved in defining a chapter's goals, the organization of our chapter into five working groups allows students who are interested in any aspect of engineering education to follow their passion and drive forward the mission of our organization. As such, in following other chapters' suggestions to recruit strongly, we aim to recruit by working group, allowing for students to be exposed to the work that we are doing so that they can quickly be integrated into the chapter.

We also recognize that a modular structure could potentially spread our chapter too thin. As Karim [8] suggests, each module must be strong enough to stand on its own and must work towards the overall or prioritized outcomes of the entire chapter. As this is a volunteer student led group, certain working groups with less dedicated members or less interest in the overall outcomes might limit the success of the modular approach. Furthermore, while the executive members are meant to maintain a central focus for their working groups, with a limited time as a whole group and the numerous goals, the working groups may diverge in interest and disagree in prioritization from the goals of the entire chapter. As our chapter evolves and matures, we hope to learn more about the long-term success of this modular structure.

Theme 2: An appropriate amount of faculty participation is key to long-term success

Chapters across the nation also identified the importance of faculty participation in maintaining continuity in the organization and in helping find funding for the many goals of an ASEE chapter. Our co-college model allows for this strong faculty participation. By having two faculty advisors in different college structures, we can maintain continuity and interest in our engineering education missions and identify opportunities to apply for funding in two distinct worlds.

Theme 3: Graduate engineering students are more often involved in these organizations

Many chapters' work was largely driven and targeted toward graduate students despite attempts to include undergraduates. By offering an undergraduate engineering working group that can attempt to define programs and initiatives that undergraduates would be interested in, we aim to increase undergraduate recruitment and participation.

Theme 4: The ASEE chapter must differentiate itself from other student clubs and the opportunities that they offer on campus

Chapters around the nation repeatedly emphasized the importance of offering students on their campuses opportunities that they would not have otherwise ranging from design opportunities to K-12 outreach to faculty development programs for graduate students. By organizing our chapter into five working groups that can each define their own unique offerings differentiated from other work on campus and specifically within and under the structure of the College of Engineering, we believe that we can increase recruitment and participation and offer a large engineering education support structure for students at all levels of their education.

Theme 5: Collaboration is present, but not essential to many chapters

Chapters around the nation tended to have collaborations with engineering education centers on campus and with other clubs and organizations targeted at outreach. In our co-college model, collaboration is central to all the work we do as education and engineering students are working together to accomplish the chapter's goals. In addition, through collaborations with other centers on campus (e.g., the Diversity and Inclusion committee's connections with the SALT Center, Graduate College, and Disability Resource Center), we are able to have a broader reach in our mission both on campus and in the local community.

While we believe that there are many strengths in our model, we also recognize that the youth of this model is still largely to be tested (especially in transitioning year to year). By setting up contact with other chapters that have years of experience, we hope to be able to maintain streams of communication so when we hit hurdles, we can have the advice and wisdom from the larger chapter structures.

As such, in addition to these thematic discussions, we would also recommend that the executive board of ASEE's student division integrate a larger structure into the ASEE Student Division offerings - the creation of a best practices document for student chapters that may help chapters at all stages. With this document, new chapters may have a resource in how to form their chapter so that it lasts and accomplishes important work, and existing chapters may find ideas for how to increase recruitment, target new populations in their work, and combat any moves toward dormancy.

Conclusion

Due to the nearly non-existent literature on cross-college, interdisciplinary approaches to ASEE student chapters, this paper provides unique and necessary information for researchers, faculty, staff, and students who are currently members of or who are interested in starting an ASEE student chapter. To fill this gap in the literature and begin work to increase the broader impact of ASEE student chapters, this study offers new information on developing, structuring, and maintaining a multidisciplinary, bottom-up model.

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