

Student Satisfaction with ASEE Activities and its Impact on ASEE Student Membership

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Abstract

The number of students participating in engineering education research, reform, and practice has been steadily growing, as seen by the increased student membership of the American Society for Engineering Education (ASEE) within the last decade. A possible source for this increased involvement includes the creation of graduate programs awarding engineering education degrees, but according to a 2010 needs analysis of ASEE student members, other sources may exist including the emergence of student-focused activities associated with ASEE. The number of student chapters, student members, and the Student Constituent Committee (SCC) members show evidence of significant and consistent growth encouraging continual development of student-focused activities.

The purpose of this study is to build upon the 2010 student member needs analysis by assessing the impact of ASEE student-focused activities. An online survey was distributed to ASEE student members, aimed at examining why the current student members joined ASEE and whether or not their involvement in the student-centered activities, i.e. SCC or student chapters, had any bearing on their participation. Results indicate the importance of professors and classmates in the recruitment of student members to ASEE. Involvement in ASEE student chapters has increased overall; yet, almost half of the sample attended an institution with no student chapter. Even though 20 percent of the participants have never attend an ASEE event, of those who had, opportunities to network and learn about academic careers were well-received by the participants. These findings illustrate the high likelihood that student representation within ASEE will continue to increase for years to come and student-centered events and activities, such as the SCC and student chapters have and could continue to have a positive impact on students.

Introduction

As a new and growing field, the future success of engineering education hinges on the interest of today's undergraduate and graduate students. Whether through positions in industry related to engineering education or as faculty members, it is the responsibility of these individuals to help define the future direction of the field.

It is reassuring to see that as the field has grown, so to have the number of students participating in engineering education research, reform, and practice. A clear indicator of increased student interest has been the steadily growing student membership of the American Society for Engineering Education (ASEE). According to the June 2010 report to the ASEE Board of Directors, student membership in ASEE has risen by 32.6% in five years, surpassing the number of life members (Table 1).¹ According to Dwight Wardell, ASEE Membership Department Head,

the student membership continues to surpass life members going into 2011 as displayed by the December 2010 membership (personal communication, January 9, 2011).

*Table 1: ASEE Membership from 2005 – 2010.*¹

	2005		2006		2007		2008		2009		2010	
	June	Oct.	June	Oct.	June	Oct.	June	Oct.	June	Oct.	June	Dec.
Life Members	791	707	722	713	717	718	712	692	704	713	719	705
Student Members	549	544	601	615	622	616	663	668	684	691	728	720

The increase in ASEE student membership and the overall increase in student involvement could be attributed to a rising availability of STEM education degrees, certificate programs, and inter-/cross-disciplinary programs in the last decade. The creation of engineering education programs at Purdue University, Virginia Tech, Utah State, and the University of Cincinnati, as well as STEM education graduate degrees at NC State, Tufts University, and others have made it possible for students to obtain a degree specifically customized to the field.² Engineering education-related certificate programs at such universities as Clemson University and Michigan State University and established inter-/cross-disciplinary programs – engineering and education – like the programs offered at the University of Georgia and Carnegie Mellon University have opened additional avenues into the field.² Graduates of all of these programs comprise a new coalition who can contribute a different perspective on teaching and research in the field.

According to a 2010 needs analysis of ASEE student members, the majority of the current student members are not interested in strictly conducting engineering education research.³ This analysis indicated students' interest is heavily focused on professional development – specifically within academia. In addition, students want to engage in K-12 STEM education activities and gain insight into effective teaching practices. These diverse interests suggest a majority of new student members are coming from degree programs other than engineering education and STEM education. Therefore, it is necessary to consider other possible sources for the rise in student involvement in the field of engineering education.

In parallel with the development of engineering education and STEM education degree programs, the engineering education community has been exposed to an emergence of student-focused activities within ASEE. These activities range from the growth of ASEE student chapters to the development of the ASEE Student Constituent Committee.

ASEE student chapters originated in 1993 when graduate students and faculty from Purdue University established the first chapter with the following objectives in mind:

- to mentor graduate students interested in engineering education, especially those considering academic careers
- to educate undergraduate students about graduate school

- to encourage underrepresented groups to pursue advanced degrees and academic careers.⁴

During the decade following, other institutions such as the University of Michigan, University of Texas-Austin, and North Carolina State University, launched ASEE student chapters on their campuses with similar missions.^{5,6} These chapters not only provided a local forum for students to assemble and network, but also avenues to learn more about the academic job hunt, proposal writing, and teaching methods through chapter events.⁷ Many alumni from this first decade of student chapters have maintained a strong connection to ASEE by becoming leaders of various ASEE divisions, publishing engineering education research in the conference proceedings and the *Journal of Engineering Education*, and/or serving as the faculty advisor for other ASEE student chapters.⁷

Almost two decades after the founding of the Purdue University student chapter, there are now thirteen ASEE student chapters, more than any previous year.⁸ Additionally, in the coming year, another eight chapters will begin the process of applying for chapter status with diverse goals and objectives unique to each campus. Each of the active and prospective chapters are committed to promoting the field of engineering education and providing opportunities for undergraduates and graduate students to learn more about graduate school and academic careers.⁸ While many of the events organized by these student chapters have remained the same since 1993 (*e.g.*, lunch seminars with faculty members, workshops on paper writing), new events have focused primarily on engaging K-12 students in engineering.^{6,9,10} The full effect of these chapters remains to be seen, but one can already find many recent graduates in post-doctoral or faculty positions related to engineering/STEM education.

The increase in student members and student chapters created a need for increased coordination at the national level.^{11,13} In 2007, a national voice for the students was established within ASEE through the launch of the Student Constituent Committee (SCC).³ The committee has an advisory council of faculty and industry leaders along with an executive council of student leaders.³ The first council was elected in 2008 and includes a Zone Liaison position responsible for representing and assisting student chapters.³ Since 2008, the SCC has grown to close to 200 members and has created a consistent presence at the ASEE Annual Conference and Exposition through an annual student dinner, joint panels with the New Engineering Educators Division, poster sessions, and workshops.⁸ Over the next year, the SCC will apply for full division status and continue to evolve in order to serve the growing student population within ASEE.

ASEE Headquarters and various divisions have also worked to create additional opportunities for student members of ASEE to network with faculty and students from other institutions. For instance, students have presented and contributed papers to the section, zone, or national conference proceedings. At past conferences, student-authored papers have won numerous division best paper awards and PIC outstanding paper awards.¹¹ A quarter of the PIC Outstanding Paper Award authors at the 2010 ASEE Annual Conference and Exposition were students.¹² There has also been an increased emphasis on student involvement at many of the region and section meetings. The weight that student involvement carries at these meetings appears to be highly dependent on the student involvement at the host institution and the geographical location of the meeting. For example, the organizers of the 2009 Midwest region

meeting hosted by the University of Nebraska noted that they focused their efforts toward subsidizing the attendance of non-paper presenting students. As a result 11 students, nine of whom were from the University of Nebraska, attended the 2009 Midwest region meeting (Dan Schulte, personal communication, December 14, 2010). This was a significantly larger cohort than the three students who attended the 2010 Midwest region meeting hosted by the University of Kansas in Lawrence. All students who attended the 2010 meeting presented papers (Francis Thomas, personal communication, December 14, 2010). Planning is already in process to boost these numbers for the 2011 Midwest region meeting at Arkansas Tech in Russelville and the 2012 meeting at the Missouri University of Science & Technology in Rolla.

Beyond student chapters, SCC, and region meetings, ASEE has continued to promote student involvement in engineering education through the creation of the “Bring-A-Student” program, which allows students to attend the ASEE Annual Conference without an ASEE membership. Engineering education departments at institutions such as Virginia Tech have organized workshops to provide opportunities for graduate and post-doctoral students to explore positions in academia. In addition, faculty and students have united in the creation of a Ph.D. Consortium for Engineering Education, which will evolve into an active consortium for 2012.

With the continual development of student chapters, the SCC, and other student-focused activities, it is necessary to understand the effect of these activities on the marked increase in student participation in the field of engineering education. Therefore, the purpose of this study is to build upon the 2010 student member needs analysis by assessing the impact of these ASEE student-focused activities on student participation. This study analyzes the impact the SCC and student chapters have had on the student membership. To accomplish this goal we examine why the current student members joined ASEE and whether or not their involvement in any ASEE-related event or group had any bearing on their participation

Research Methods

Data Collection

A survey was developed to conduct a continuation study of the 2010 ASEE student members’ needs analysis.³ Pertinent demographic information remained a component of the survey with additional questions addressing participation in and satisfaction with student events. Student events ranged from a dinner held by the SCC at the National Conference to a joint panel session on applying for faculty positions co-sponsored by the New Engineering Educators Division. The 18-item survey was distributed using a web-based infrastructure supported by Google. The items included fill-in the blank, open-ended, multiple choice, and Likert-type questions. Respondents were given the option to skip any question they were unwilling to answer.

Participants were solicited in fall 2010 using three outlets: 1) ASEE student membership directory, 2) ASEE Student Chapters’ membership, and 3) the Frontiers in Education (FIE) Birds of a Feather event. The ASEE SCC Chair and ASEE SCC Zone Liaison sent identical email invitations to the student memberships, respectively. A reminder was sent to all students one month after the first invitation. To increase participation, students attending the FIE conference were given an opportunity during the Birds of a Feather event to fill out the survey.

The cohort, described in the following sub-section was representative of both the 2010 study and the current membership of the SCC.

Participant Demographics

Over 700 students were solicited to participate in the study. Of the 700 possible respondents, we were able to obtain 115 responses (16% response rate). The sample included at least one respondent from 50 institutions (14 international). Only four institutions had more than 5 responses (Virginia Tech, 17; Purdue University, 13; University of Illinois, Urbana-Champaign, 9; and Stanford University, 8).

More females (51%) were included in the study with almost an even split between the genders (Males = 48%). Only 1% of the sample abstained from answering the question. The close to even representation is a shift from the 2010 study (61% males; 39% females), but matches the current SCC membership, which provides a more accurate representation of the ASEE student membership.

Two-thirds (66%) of the student sample self-identified as being Caucasian. The remaining participants included Asian American/Pacific Islander (8%), Hispanic (7%), African American (7%), and other/not provided (7%). The distribution across race/ethnicity was almost identical to the 2010 study.

Six age ranges were provided for participants to select: 18-21 (3%), 22-25 (25%), 26-30 (36%), 31-35 (22%), 36-40 (6%), and 41 or older (8%). The majority of the respondents were clearly in the typical age range for doctoral students (22-35). The overall approximate average age was 30.

The overall sample consisted of individuals majoring in 27 different majors. As was the case with the 2010 study, the majority of the students (62%) were enrolled in Engineering or Technology degree awarding programs; however, a much larger portion of this year's sample (38%) were enrolled in Education degree awarding programs. An astounding 29% of the students working toward an education-related degree were pursuing a doctorate in Engineering Education; a clear indication of the shift occurring in the degrees offered.

Expected semester of graduation varied greatly within the sample of students. Respondents included recent 2009/2010 graduates (19%) and those expecting to graduate in 2011 (26%), 2012 (25%), and 2013 or later (30%).

The majority of the sample consisted of Doctoral students (85%) interested in a future career in academia (71%). The remaining sample consisted of 10% Master's and 5% Bachelor's students. Little interest was expressed in careers outside of academia such as research (7%), industry (10%), or K-12 teaching (1%). Some students were still undecided (4%) and one Bachelor's student expressed interest in continuing to study to pursue an advanced degree. Other possible career paths included becoming a university president, entrepreneur, government official, consultant, STEM policy maker, and teaching consultant.

Results

Our study included an analysis of where students learned about ASEE, length of ASEE membership, reasons for belonging to ASEE, student chapter involvement, and participation in student-centered events.

Learned about ASEE through...

The vast majority (62%) of participants learned about ASEE through a professor (Figure 1). This is consistent with the 2010 study, in which 52 percent of respondents did the same. Compared to last year's survey, on this survey a larger percentage of respondents cited a classmate as the reason they learned about ASEE.

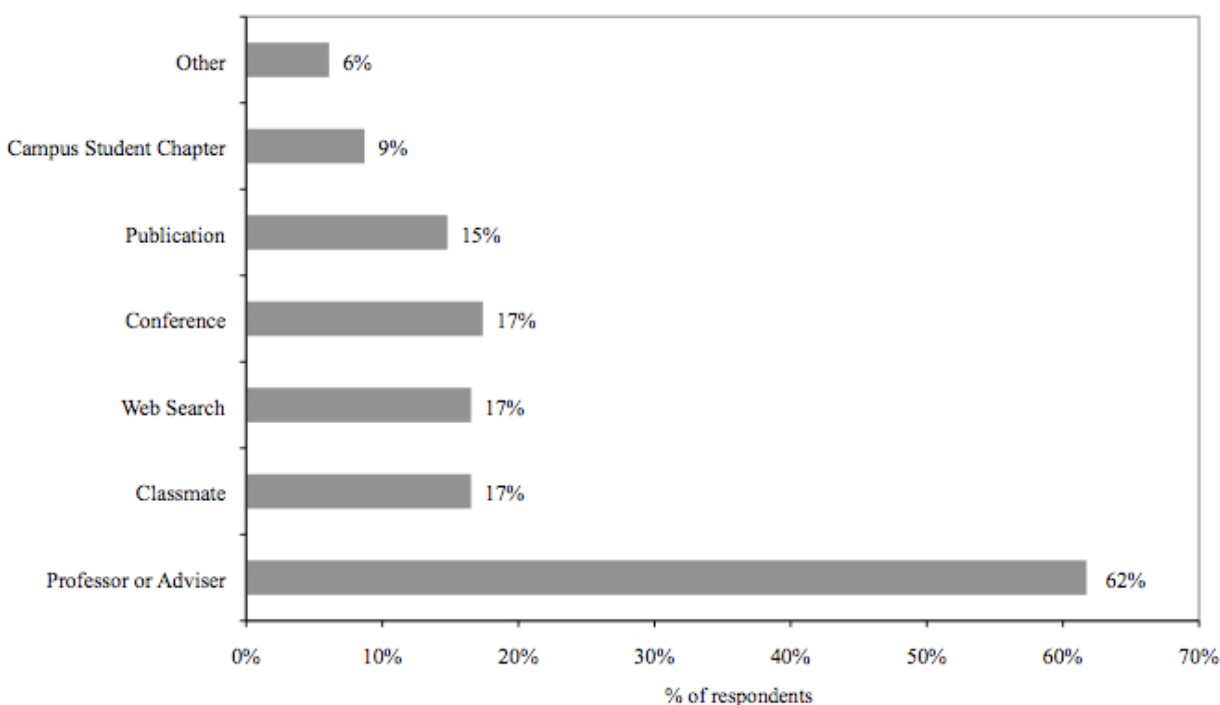


Figure 1 - How Respondents Learned about ASEE

Length of ASEE Membership

Sixty-nine percent (69%) of survey respondents joined ASEE within the last two years (Figure 2). As in the 2010 study, the largest group of students has been ASEE members for 1-2 years. This is not surprising considering the length of time it takes to complete a graduate degree.

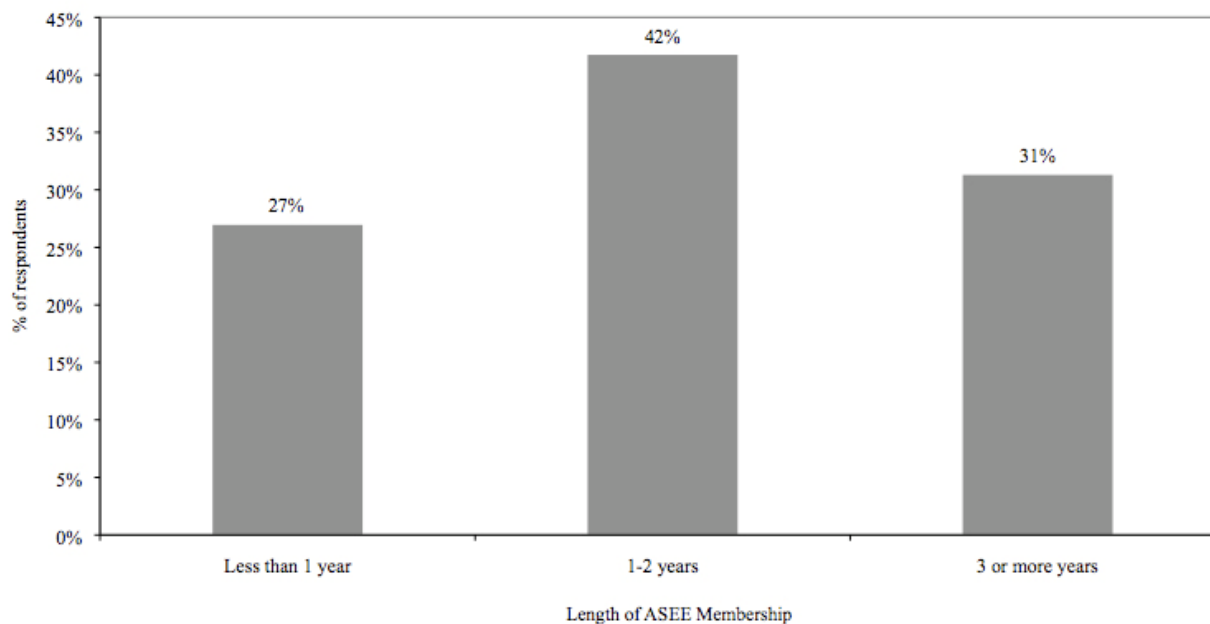


Figure 2 - Length of ASEE Membership

Reasons for Belonging to the ASEE

The most frequently cited reasons for belonging to the ASEE were a General Interest in Engineering Education, an Interest in Academic Careers, and Interest in Engineering Education Research. Other reasons for belonging to ASEE are listed in Table 2. Respondents were allowed to choose all options that applied.

Table 2 - Reasons for Belonging to the ASEE

Reasons for Belonging to ASEE	n
I am generally interested in engineering education	104
I am interested in an academic career (higher education)	85
I am interested in conducting engineering education research	75
To network with others interested in engineering education	75
To learn about teaching engineering	74
To attend and/or present at ASEE conferences	67
To access ASEE publications	50
I am interested in becoming a K-12 teacher	4
Other	3

The top three reasons for belonging to ASEE were consistent with the findings from the 2010 study.

Membership in ASEE Student Chapters

Slightly over half of the respondents (52%) were members of an ASEE student chapter, including 29 percent who are or have been chapter officers (Figure 3). Forty percent (40%) of respondents did not have access to a student chapter in their institution at the time the survey was conducted.

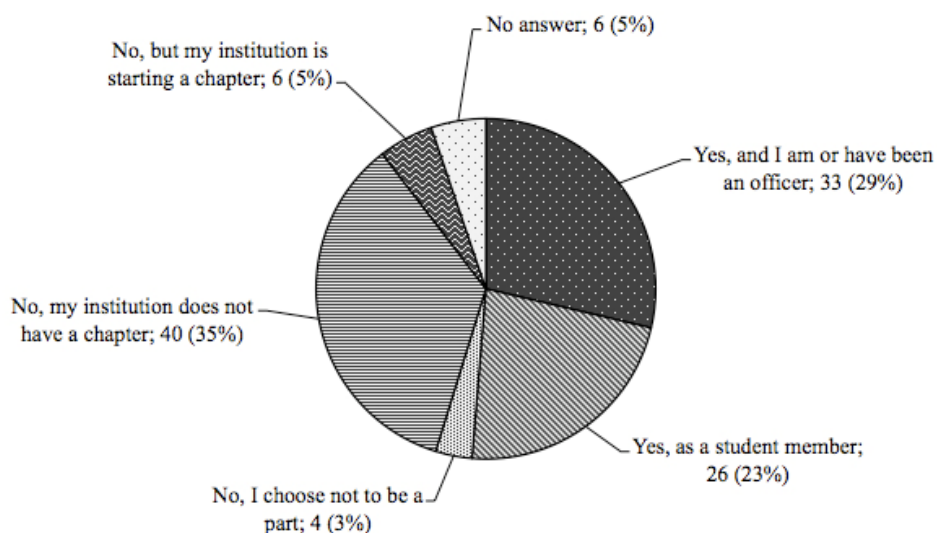


Figure 3 - Membership in ASEE Student Chapters

Student Events

Participants were asked to identify the student-specific activities they attended and rate how influential those activities had been on their decision to join/remain an ASEE member. Influence was ranked according to a 5-point Likert scale ranging from “Not very influential” to “Very influential”.

The highest attended and highest rated event was the ASEE National Conference as shown in Table 3. This can be explained by a variety of factors including cost – free for students, time of year – scheduled in June each year, and content – engineering education publish-to-present format encourages attendance. Not surprisingly, the areas where the student constituent committee (SCC) focused their efforts received high ratings (e.g., national conference, Frontiers in Education, or campus chapter activities) as opposed to those with limited support (e.g., global colloquium, ASEE sponsored outreach activity, or region/section meetings).

Table 3. 2010 Events Participated In

Event	Attendees	Event Rating
ASEE National Conference	77	3.97
Campus ASEE Chapter Activity	64	3.19
ASEE Regional or Sectional Meeting/Conference	50	2.56
Frontiers in Education	43	3.02
ASEE Sponsored Outreach Activity	36	2.31
ASEE Global Colloquium	31	1.81

The lowest rated event was the ASEE Global Colloquium. It will be interesting to review future survey results to see if this improves based on some on-going collaboration between domestic U.S. and international organizations. For example, within the past year the ASEE SCC reached a memorandum of understanding with the Student Platform for Engineering Education Development (SPEED), which has a more global scope of operations. Based on increased student participation in events, additional student specific events have been offered. A list of these events with their attendance by the sample and ratings are shown in Table 4.

Table 4. 2010 Student Specific Events

Event	Attendees	Event Rating
SCC Annual Dinner	45	3.31
SCC/NEE Networking Session	40	3.35
SCC Business Meeting	37	3.14
PhD Consortium Workshop	33	3.52
Student Poster Session	33	2.94
SCC/NEE Roundtable Panel Session	30	3.33
Other SCC Sessions	27	3.00
Regional Student Networking Events	21	2.81
FIE - Birds of a Feather	20	2.90
Other	11	2.55

The highest rated student event was the Ph.D. consortium workshop held at the ASEE 2010 National Conference in Louisville, Kentucky. Most events scored close to the average of 3.08 for student specific events. It can be inferred that events of interest to the SCC, *i.e.*, those in which the SCC was involved in the planning and executing, scored higher than other events – average of 3.28. It is also of importance to note that nearly 20 percent of the respondents have never attended a single ASEE event.

Discussion

The results of this study provide insights about those students who are interested in ASEE and how the current members have received student-centered efforts. Contrary to the typical trends in the engineering and education fields, the sample included almost equal representation between the genders – engineering: 32 females, 31 males; education: 24 females, 19 males. This equal gender representation along with the high percentage of this sample interested in academic careers and working toward doctoral degrees – education: 37%; engineering: 60%. – represent a shift from the current demographics in both schools and departments of engineering and

education. This finding may be a result of the 16 percent response rate. The overrepresentation of doctoral degrees also suggests a need to increase efforts to attract undergraduate and master's students into ASEE.

Of the students working toward education-related degrees, 70 percent were focused on engineering education and represented the largest faction within the entire sample. This result showed a strong presence of the new engineering education departments evidenced by the sample from Purdue (N = 13) and Virginia Tech (N = 17). Also influencing the ASEE student population was the involvement of professors. Professors are an obvious resource for students and represented the greatest outlet for students to learn about ASEE. This result was consistent with the 2010 study and is believed to be a given continued source for students to become members of ASEE. A noticeable increase in the percent of students who cited other classmates – from 8% to 17% – as having impacted their involvement in ASEE. This is a clear indication that students are starting to become bigger advocates of ASEE within their institutions.

A possible reason for students becoming bigger advocates of ASEE is the increase in student chapters. The results of the student chapter analysis show an increase in students becoming involved or wanting to create student chapters; however, 40 percent of the students who participated in this study did not have a chapter at their institution. A major effort of the SCC has been and will continue to be working toward increasing the number of student chapters. More chapters will not only supply opportunities for students to get involved in engineering education, but will also bring ASEE to the forefront at these institutions.

Part of each student chapter is a mission to impact K-12 education. The 2010 study showed that students were interested in participating in K-12 STEM outreach. This year's results showed a very small number of students were interested in K-12 teaching. One cannot perceive K-12 outreach being equivalent to K-12 teaching, but this result does suggest that the addition of students interested specifically in K-12 STEM teaching would help enhance the general K-12 initiatives intended by ASEE and the SCC. ASEE does offer a number of opportunities to participate in K-12 initiatives, which could draw such students eventually to the society, yet additional outreach to graduate students could be necessary.

Overall, ASEE events were rated by the sample of students to be neutral in the participation in ASEE. SCC involvement seemed to raise the overall score of events, as the average score omitting non-SCC events was 3.30 compared to 2.8 for the remaining activities. The impact of the SCC and other student-centered activities does not appear to be a big factor as to whether students want to participate in ASEE.

Opportunities to network and learn about academic careers were rated highest by the sample of students. It is also important to note that almost 70 percent of the sample attended the ASEE National Conference, which offers the most opportunities to participate in student-centered events and network. Slightly surprising is that 20 percent of students who had never attended an ASEE event. This could be correlated to the 27% of students who are new to the organization; however, this could also be due to a lack of interest, funding, or some other external cause. Timely event communications such as e-mails and newsletters should promote and encourage attendance of the events listed in Tables 3 and 4. Student attendance could rise if there is an

increase in student awareness of the opportunities being established strictly for their benefit. The continued goal of the SCC will be to modify and add events that will attract those who are currently not taking advantage of these opportunities.

Conclusion & Implications

It is likely student representation within ASEE will continue to increase as the general interest in engineering education research increases as well. The SCC and student chapters appear to have a positive impact and should be viewed as means to organize and direct the student voice. As the student population grows, ASEE should rely on continued support by the SCC, student chapters, professors, and initiatives like the 'bring a student' program.

A greater focus on students will help increase institution-level representation through the development and continued activity of student chapters. At the national level, ASEE needs to continue to offer diverse student membership with new and interesting events and activities. This study suggests that students are most interested in professional development rather than engineering education research. Future activities should be based on this finding coupled with the data that students join ASEE because of a general interest in engineering education, academic careers, research, teaching, and networking.

ASEE, and specifically the SCC, should continue to focus their efforts on the National Conference, the regional and section meetings, and the Ph. D. consortium to provide students sufficient opportunities to learn and network. The high percentage of students attending the national conference each year suggests a need to reach out to these students and continue to improve the activities and sessions relating to students' interests.

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Disclosure

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