

AC 2010-540: ASEE STUDENT MEMBERS' NEEDS ANALYSIS: IMPLICATIONS FOR THE ASEE STUDENT CONSTITUENT COMMITTEE

Ana Torres-Ayala, University of South Florida

Ana T. Torres-Ayala is a doctoral candidate in Higher Education at the University of South Florida. She holds a BS degree in Computer Engineering from the University of Puerto Rico at Mayagüez and a MEng degree in Computer and Systems Engineering from Rensselaer Polytechnic Institute. She has experience in the telecommunications industry where she worked for Lucent Technologies. Before beginning her doctoral studies, Ana was also an Information Technology instructor. Her research interests include: preparing future engineering faculty, improving teaching, distance education and underrepresented student success.

Daniel Bumblauskas, Iowa State University

Dan Bumblauskas has been with ABB Inc., since 2003 and is presently a group account and marketing manager. Dan is a PhD student in the department of Industrial and Manufacturing Systems Engineering at Iowa State University, Ames, Iowa, where he has been conferred B.S. and M.S. degrees in Industrial Engineering. Dan is also a masters degree candidate at Harvard University, Cambridge, Massachusetts, in general management.

Matthew Verleger, Purdue University

Matthew A. Verleger is a Post-Doctoral Researcher in Purdue University's School of Engineering Education. He received his Ph.D. in Engineering Education in 2009, also from Purdue. His research focuses on Model-Eliciting Activities and the first-year experience. He will be starting a job in August as an Assistant Professor of Engineering and Technology Education at Utah State University.

ASEE Student Members' Needs Analysis: Implications for the ASEE Student Constituent Committee

Abstract

The American Society for Engineering Education (ASEE) attracts student members, but until recently they were not formally organized and as a consequence their role within the national organization was unclear. To help clarify their role and interests, a survey of ASEE student member needs was conducted by the Student Constituent Committee (SCC). An invitation to participate in a web survey was sent to all student members of ASEE (N=635). Ninety-seven (15%) students responded to the invitation. Ninety-three percent of respondents were graduate students.

This paper presents the aggregate results of all 97 respondents. It includes a profile of survey participants, motivations for joining the ASEE, experiences with the ASEE, interests and suggestions. Additionally, this paper will discuss the implications those results had on the SCC Executive Board's immediate plans for the 2009-2010 year, as well as on the longer term strategic plan of the SCC.

History of ASEE Student Members

Since its creation in 1893 the American Society of Engineering Education (ASEE) has attracted faculty, administrators, and industry representatives committed to furthering education in engineering and engineering technology. The ASEE also attracts student members but until recently they were not formally organized.

The first step towards establishing a student voice within the organization occurred in 1993 with the formation of the first student chapter at Purdue University¹. Since then, student chapters have been established at many other universities. The goals of these chapters depends on local interests but may include one or more of the following: “encouraging undergraduate engineering students to attend graduate school and aiding in their decision of where to apply or attend, aiding graduate engineering students in preparing to seek employment in academia, recognizing outstanding teaching through administration of teaching awards, adding to the sense of engineering community by drawing across all engineering disciplines, and performing outreach activities to encourage K-12 students to consider studying engineering”². A more detailed discussion of past student involvement in ASEE can be found in a 2005 paper².

Despite the proliferation of student chapters around the country, they were (and continue to be) local centers of activity. In 2007, in order to provide a national voice within the organization, the ASEE board approved the formation of the Student Constituent Committee (SCC), with the long-term goal of forming a Student Division. To help guide the organization's student leaders, an advisory council was formed consisting of faculty and industry leaders familiar with ASEE. In 2007, that advisory council formed sub-committees to develop by-laws, nominations, recruiting, and the 2008 program. The SCC elected their first executive council at the 2008 ASEE National Meeting in Pittsburgh, PA.

The stated goals of the SCC include:

1. Fostering programs for ASEE student members at regional and national ASEE meetings.
2. Promoting the development at ASEE Student Chapters at local campuses.
3. Participating in local K-12 science, technology, engineering and mathematics (STEM) education activities.
4. Promoting graduate school opportunities for undergraduate ASEE student members.
5. Promoting scholarships, fellowships, and post-doctoral opportunities for ASEE student members.
6. Providing opportunities for students to gain insight into academic careers and teaching practices.
7. Developing ties between ASEE Student Division members and ASEE Corporate members
8. Developing international opportunities for ASEE Student Division members.
9. Developing the next generation of ASEE leaders
10. Building a Community of Student Members³

The survey

In 2008, discussions between the SCC Executive Board and its Advisory Committee identified the need to understand the profile of student members and what motivates them to join the organization. For this purpose a needs analysis of ASEE student members was conducted in Spring 2009.

Method

A survey was prepared based on questions of interest to the SCC board and the stated goals of the SCC. To collect responses from geographically dispersed members in an economical and timely matter the survey was created as a web form. The final survey consisted of 36 items. The items included fill-in the blank, open-ended, multiple choice, and Likert-type questions. Respondents could skip any question.

In April 2009, all student members in the ASEE Member Directory were invited to participate in the survey. At that time, ASEE had 635 student members (N=635) listed in the Directory. An e-mail invitation was sent by the ASEE SCC Chair to all student members. The survey was open for two weeks. A reminder was sent to all students four days before closing the survey. There was no incentive for students to complete the survey. Ninety-seven (n=97) students completed the survey. This relatively low response rate (15%) is a limitation of the survey. Nonetheless, these findings provide some insight into the characteristics and needs of the participants.

Findings

Participant Profile

Gender and Race/Ethnicity

Men constituted the majority (61%) of the sample. Females represented 39% of sample respondents.

Two-thirds of students self-identified as Caucasian. These were followed by International and Hispanic students (8% each). Asian American/Pacific Islander students represented 6% of the sample while African-American students were 4% of the sample.

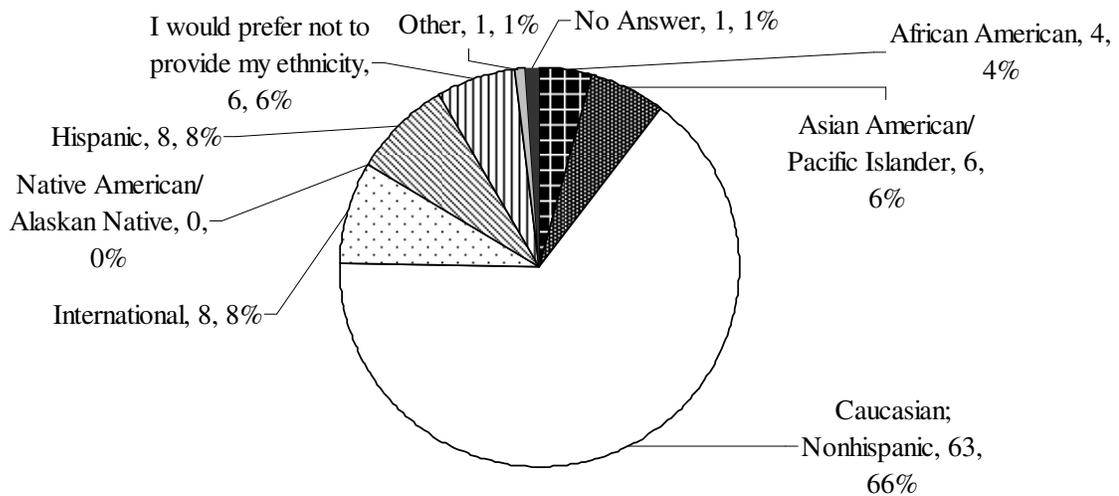


Figure 1 – Race/Ethnicity of Respondents (n=97)

Degree Pursued

Ninety-three percent of respondents were graduate students (Figure 2). Specifically, three-quarters (75%) of the respondents were pursuing a doctorate degree while 18% pursued a Masters degree. Six percent of students in the sample pursued Bachelors degree at time of the survey. Although the survey did not provide a High School option, it was surprising to learn that one respondent revealed in another question he was a high school student.

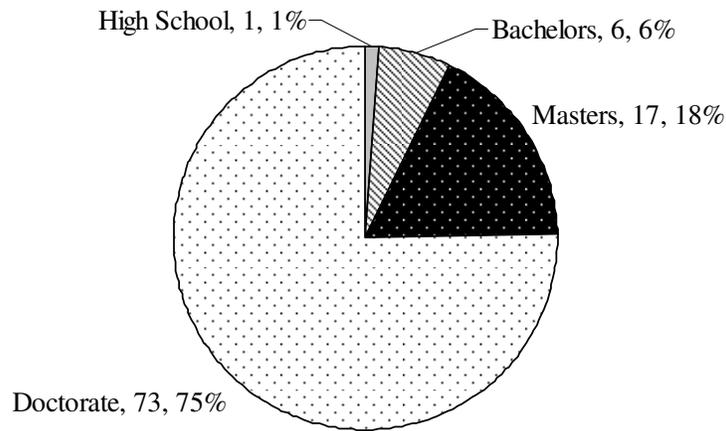


Figure 2 – Degree Pursued by Respondents (n=97)

Major

Survey participants represented 34 different majors (Table 1). Most respondents (81%) were enrolled in an Engineering or Technology programs. Thirteen percent (13%) of respondents were in Education programs (Figure 3).

Major	Count	Major	Count
Mechanical Engineering	17	Chemistry Education	1
Engineering Education	9	Computer Science Education	1
Biomedical Engineering	8	Educational Research	1
Electrical Engineering	8	Engineering Science	1
Chemical Engineering	7	Geotechnical Engineering	1
Civil Engineering	6	Higher Education	1
No Answer	4	Materials Engineering	1
Education	3	Nuclear Engineering	1
Industrial Engineering	3	Optical Engineering	1
Instructional Technology	3	Organizational Systems	1
Computer Science or Engineering*	3	Petroleum Engineering	1
Environmental Engineering	2	Science and Technology Studies	1
Interdisciplinary Engineering	2	Science Education	1
Technology Education	2	Sociology	1
Aerospace Engineering	1	Software Engineering	1
Agricultural Engineering	1	Systems Engineering	1
Agricultural and Industrial Technology	1	Water Resources	1

* Includes a double major in EE and CS/CpE

Table 1 – Major of Study (n=97)

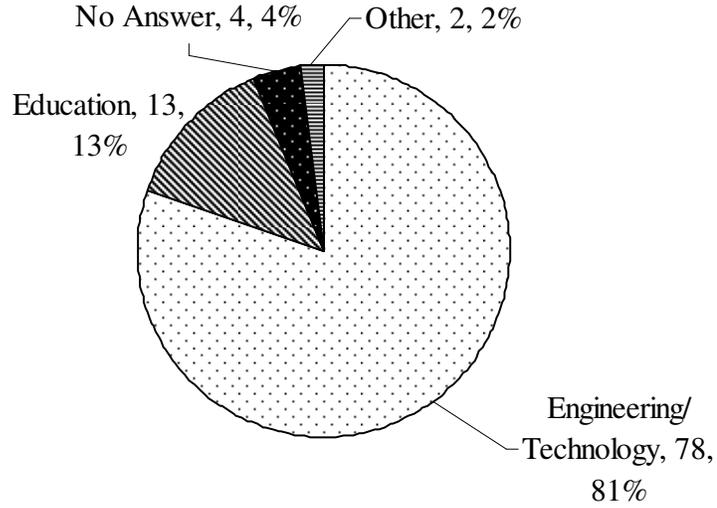


Figure 3 – General Area of Study (n=97)

Expected graduation

Most respondents were near the end of their studies. The vast majority (71%) expected to graduate within a year of the survey.

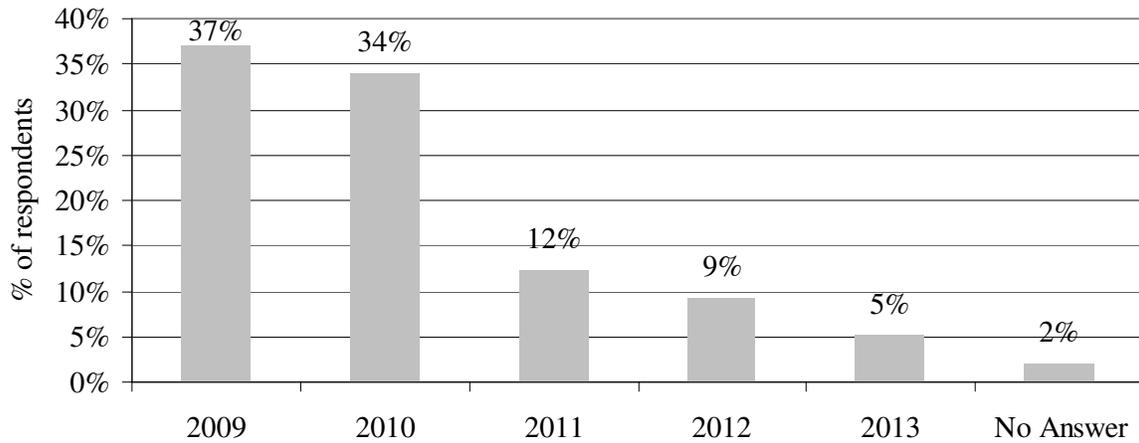


Figure 4 - Expected Graduation (n=97)

Intended career after graduation

Most of the respondents intend to pursue an academic career (55%). A significant portion of the sample (18%) was undecided about their future plans.

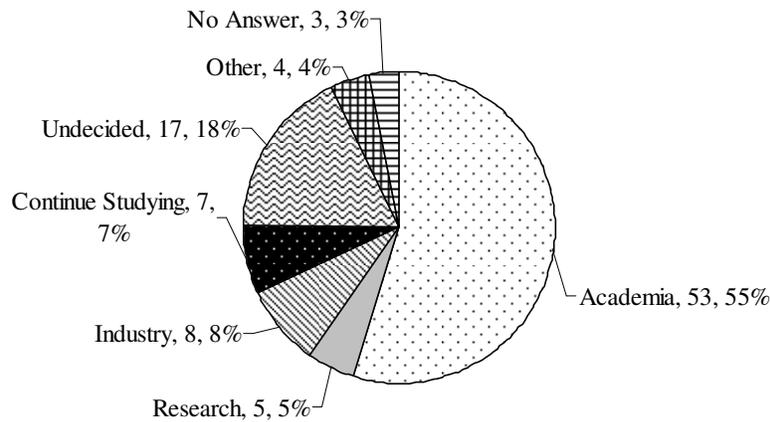


Figure 5 - Intended Career after Graduation (n=97)

Motivations

The survey sought to explore what motivates students to participate in ASEE. Students were asked their reasons for joining ASEE and what they perceive as the benefits of ASEE membership.

Reasons for joining

Students were asked “Why did you decide to join ASEE?” Their answers were coded and fourteen themes emerged. Each theme, its frequency and representative quotes, is listed in Table 2.

Theme	n	Representative Quotes
General interest in engineering education	18	<i>“I am very interested in Engineering Education and thought that joining ASEE would be a good way to get more involved and become more knowledgeable about the field.”</i>
Interest in academic career	14	<i>“Becoming a member of ASEE seemed like a natural step since I am interested in academic instruction.”</i> <i>“Information about academic career choices and teaching techniques/methods”</i>
Interest in engineering education research	13	<i>“one of my research interest is engineering education at the higher education level”</i> <i>“I’m studying engineering education”</i>
Access to publications	10	<i>“Access to publications for my dissertation... “</i> <i>“I read an interesting article from an ASEE magazine and decided to join.”</i>

Interest in attending conference	9	<i>“Conference attendance at student member rate.”</i>
Learning about teaching engineering	8	<i>“I wanted to learn more about methods of teaching engineering concepts.”</i>
Presenting at a conference	7	<i>“I presented at an ASEE conference and was interested in keeping up with the organization thereafter.”</i>
Interest in improving quality of engineering education	7	<i>“To improve the quality of engineering education for current and future engineering students in all engineering disciplines.”</i> <i>“The US needs to pursue (sic) engineering education. We are falling behind and I felt that by being involved in ASEE I could help push this agenda.”</i> <i>“I am interesting in how I can contribute to improving how engineering students can learn - after experiencing what I considering the alternative for the most part during my education.”</i>
Networking	6	<i>“It provides one of the few networking opportunities related to higher education teaching. Also; spans multiple disciplines unlike most societies.”</i>
Encouraged by a faculty member	3	<i>“Faculty members had suggested joining so I could submit papers written for class as conference papers...”</i>
Organization	3	<i>“to learn more about the organization”</i> <i>“I presented at an ASEE conference and was interested in keeping up with the organization thereafter.”</i>
Participating in local chapter activities	2	<i>“I had been working with our student chapter and became [a board member] so felt it was time to get more involved.”</i>
Interest in professional development	2	<i>“professional development”</i>
Work dissemination	2	<i>“I was seeking an opportunity to present some of my research quickly.”</i>

Table 2 – Reasons for joining ASEE (n=90)

Key Benefits of ASEE Membership

When asked to identify key benefits of ASEE membership, the most frequently cited benefit was the opportunity to network. The eleven themes that emerged, their frequencies and representative quotes are listed in Table 3.

Theme	n	Representative Quotes
Networking	22	<p><i>“meeting others with similar interests”</i></p> <p><i>“Increase contacts”</i></p> <p><i>“Networking fellow women engineers”</i></p>
Publications	17	<p><i>“Access to JEE”</i></p> <p><i>“newsletters”</i></p>
News on engineering education	16	<p><i>“keep updated with the news in Engineering education”</i></p> <p><i>“I enjoy receiving information about workshops and conferences related to my particular interests”</i></p>
Access to engineering education research	12	<p><i>“access to leading edge education research”</i></p> <p><i>“the opportunity to ... see the newest teaching research from other faculty”</i></p>
Conference	12	<p><i>“conference registration discount”</i></p>
Community	9	<p><i>“Provides forum for graduate students interested in education in engineering that normally would not be there.”</i></p> <p><i>“opportunity to interact with ASEE community. WIED (women in engineering) group is also very good”</i></p>
Learning about teaching engineering	9	<p><i>“Learn a lot about education theory in general; get great ideas to implement in the classroom”</i></p> <p><i>“it was a new way of thinking about the engineering field and how to understand the process of teaching and learning”</i></p>
Opportunities to disseminate work	8	<p><i>“opportunity to present work”</i></p>
Not sure	3	<p><i>“I’m not sure yet”</i></p> <p><i>“I haven’t had a change (sic) to find out.”</i></p>
Career	2	<p><i>“Learning about teaching careers”</i></p>
Job listings	1	<p><i>“PRISM job listings”</i></p>

Table 3 – Key Benefits of ASEE Membership (n=73)

Experiences

The survey sought to understand the participants’ experiences in ASEE. For this purpose it was explored how long they had been members, how they learned about the organization and the activities in which they participated.

Length of ASEE membership

Although most participants were near the end of their studies, they are relatively new to ASEE. The vast majority (81%) of survey respondents joined ASEE within the last two years.

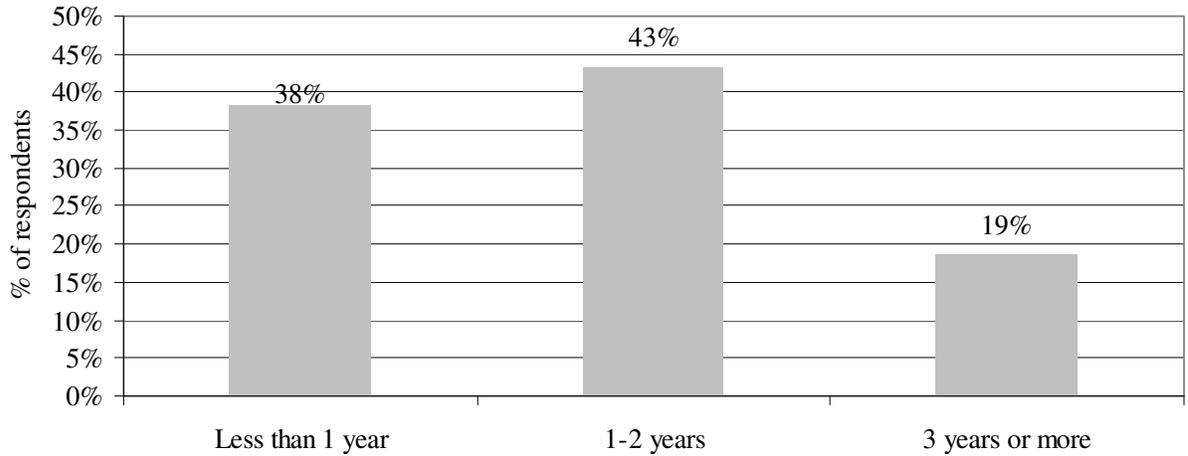


Figure 6 - Length of ASEE Membership (n=97)

Learned about ASEE through ...

The majority of respondents (52%) learned about ASEE through a faculty member. This was followed by Web Searches (12%). Although this might not be a reflection of the overall student membership, it was surprising to see a low percentage (6%) of students in the sample that learned about the ASEE through student chapters.

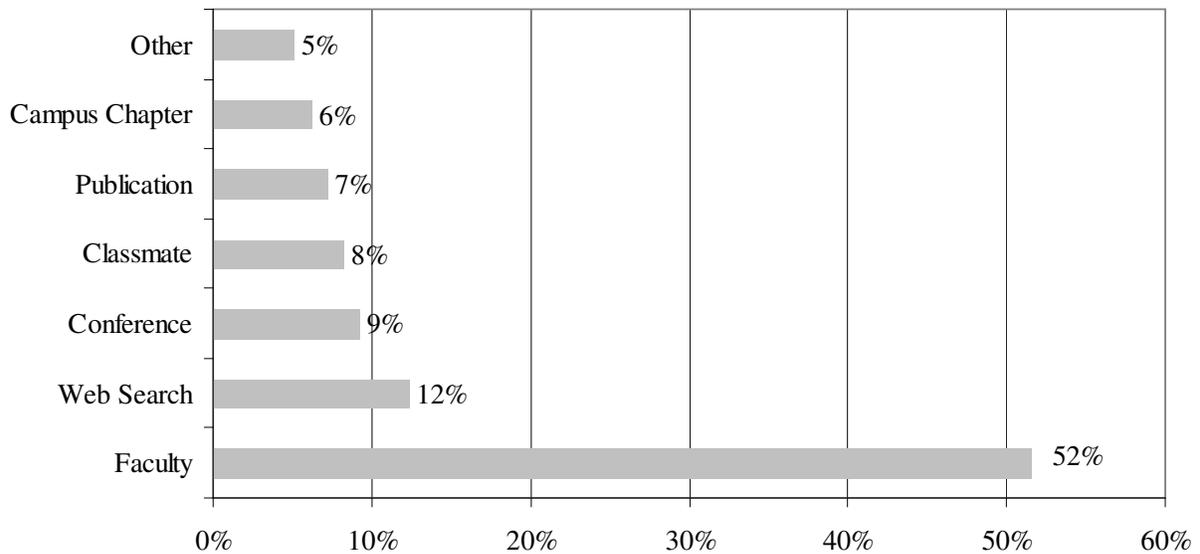


Figure 7 - How Respondents Learned about ASEE (n=97)

Participation in ASEE events

Students were asked to indicate their participation in ASEE events. Each respondent could select one or more events. The most often mentioned activity was the National Conference (40%), followed by campus chapter activities (23%) and regional meetings (23%). Over one-third of respondents was not actively involved (5) in ASEE or declined to answer the question (31).

Since 60% of respondents did not indicate participation in the National Conference, we took a closer look at the other events in which these students did participate. Results indicate they are involved in Regional Conferences (10) or local campus chapter activities (10).

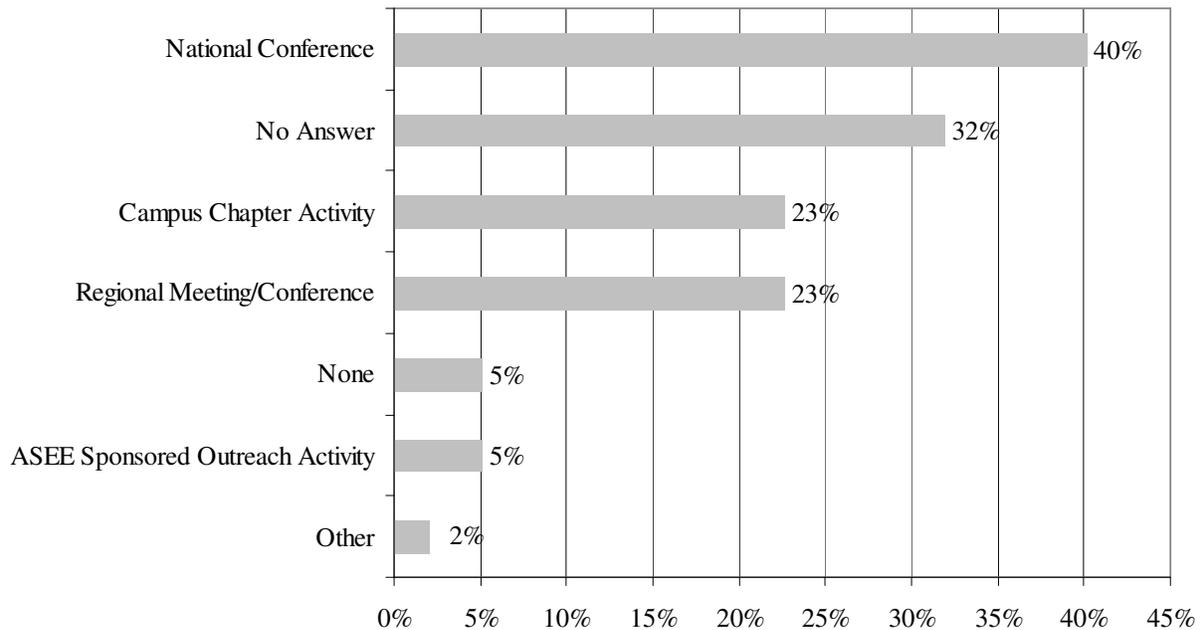


Figure 8 - Participation in ASEE Events (n=97)

Are you currently a member of the Student Constituent Committee (SCC)?

Only 14% of the sample was a SCC member. Two-thirds of respondents were either not familiar with the SCC or not a member.

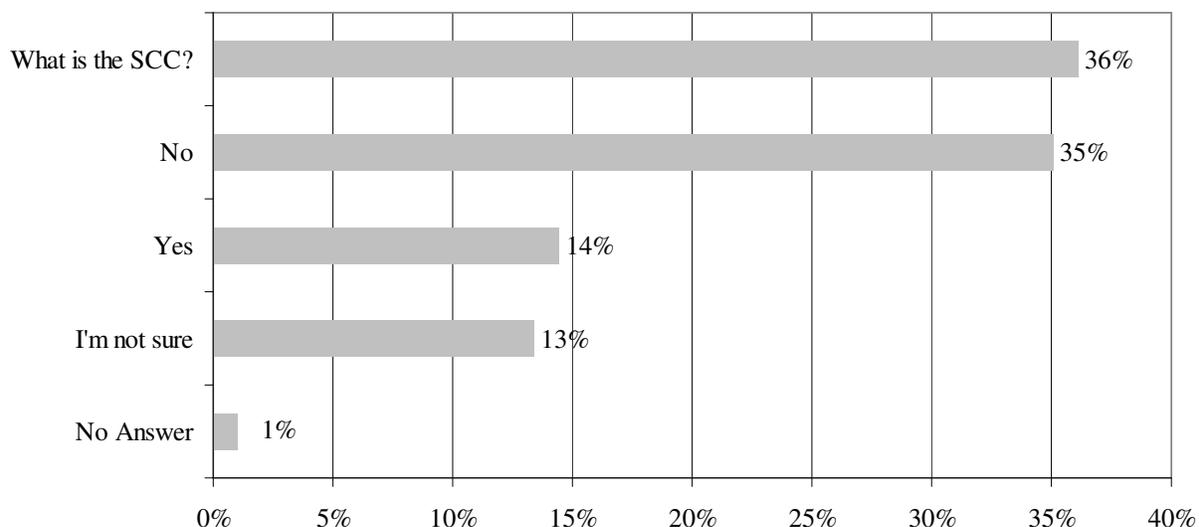


Figure 9 - SCC Membership among Respondents (n=97)

Interests

Finally, students were asked to rank their interest in potential SCC activities. The twenty (20) activities listed were based on the goals stated in the SCC bylaws. Interest was ranked according to a 5-point Likert scale ranging from “Not at All Interested” to “Extremely Interested”.

The ten (10) activities with the highest average interest were the following:

Activities	Average Interest
1. Opportunities to present research on engineering education	3.58
2. Professional development to learn about academic careers	3.52
3. Networking to find research collaborators	3.47
4. Providing opportunities for students to gain insight into academic careers and teaching practices.	3.40
5. Participating in local K-12 science; technology; engineering and mathematics (STEM) education activities.	3.36
6. Professional development to learn about funding opportunities	3.32
7. Networking to find employers	3.29
8. Opportunities to discuss work-in-progress	3.24
9. Promoting scholarships; fellowships; and post-doctoral opportunities for ASEE student members.	3.17
10. Developing international opportunities for ASEE Student members.	3.03

Table 4 – Interest in SCC Activities (n=87)

Suggestions

Students were asked to suggest other activities of interest. Four students suggested mentoring activities, two reiterated interest in teaching workshops and networking activities.

Theme	n	Quotes
Mentoring	4	<i>“opportunities to be mentored by professionals”</i> <i>“Meeting professors to work under in graduate school. Meeting leads that could produce assistanceships. (sic)”</i>
Workshops	2	<i>“Workshops for networking and learning good teaching practices. This is what I was hoping to get and I'm disappointed that there isn't any of these available.”</i>

Table 5 - Suggestions

Implications for the SCC

An interesting finding from the survey is that only 55 percent of respondents indicated an interest in pursuing an academic career. It was anticipated that this figure would be higher as divisions such as the New Engineering Educator (NEE) division have shown interest in transitioning graduates from the SCC to the NEE. This could partially be explained by the demographics of the survey population; 25% of respondents were not Ph D students. It is also intriguing that 37% of the respondents who were pursuing a Ph.D. degree did not intend to pursue an academic career. Although a few doctoral students indicated they planned to pursue careers in industry (4) or research (5), almost half (13) of these twenty-seven (27) students were undecided about their future career plans.

A large number of survey respondents (40%) participated in the national conference with 46 percent involvement in on-campus or regional activities. This provides opportunities to discuss the SCC at various outlets such as the 2010 national conference, Regional/Section meetings, and on-campus student events.

ASEE SCC Plans

Short Term

The opportunity for the growth of the SCC is exposed by the fact that over 70 percent of respondents either did not know of the SCC or were not members of the SCC. One of the highly desirable items as viewed by members in these categories is an opportunity to network. As such, a networking session was planned to be held at the 2010 ASEE Annual Conference in Louisville, KY.

In order to transition from committee to division status, the SCC must recruit new members to the organization. To accomplish this, the survey results were reviewed and actions established. Some preliminary actions included the development of a new student chapter guide⁴ which is available online through the SCC's website (<http://students.asee.org/>), a thorough review of current student chapters, and a data review of ASEE student members who are not part of the SCC. Contact was made with ASEE student members not in the SCC to advise them of our organization and reach out to them to join. The target was to have 200 SCC members by the 2010 conference.

The vast majority of students learned about ASEE from a faculty member. This relies heavily on faculty interest in the ASEE organization and knowledge of the SCC to recruit new student members. Outreach programs to on-campus organizations and communications via e-mail to student members were identified as strategies to further develop these relationships.

The SCC also launched a quarterly newsletter in 2009 which had a great response in terms of contributions and member distribution.

Long Term

The primary objective of the SCC is to continue to grow and diversify our organization to be a self sustaining division of ASEE. As such, we need to continue to recruit and retain students. This will be of even greater importance as existing members graduate and leave the SCC, believing it to be of less value to them once they are no longer students. One of the concerns highlighted by the survey is that 71 percent of the participants anticipate graduating by the end of 2010. This means that the ASEE and the SCC will need to cultivate interest in the organization among incoming students and develop student leaders to continue and sustain the SCC as it begins to transition into a division.

In order to be diverse, the SCC needs to have a wide cross section of members. As shown in the gender, race/ethnicity, and major of study figures, there was feedback from a diverse number of constituents. While it was encouraging that 39 percent of the survey respondents were female, compared with 12.3% percent of engineering faculty being female⁵, this could be that a higher percent of female respondents actually completed the survey.

While schools with engineering education programs of study are closely aligned with the ASEE and SCC, there is much opportunity for growth at schools across the United States and abroad. The SCC does have international members, so the possibilities for growth are borderless. In 2010, the SCC will continue to strategize on ways to grow and develop the organization at business meetings and during technical session discussions. One such concept was the utilization of 'virtual chats' between SCC members and local on-campus student chapters.

Mentoring opportunities between new faculty members and aspiring faculty members is also an opportunity for the SCC. Both the New Engineering Educators division and the SCC have interest in linking these two groups together for possible collaboration and career guidance.

Conclusion

The ASEE Student Member survey expanded the SCC Executive Board members' understanding of student needs and experiences. It revealed that most of the survey participants had an interest in academic careers but many others were undecided about their future plans. It also became evident that many students are not well informed about the SCC or are attending the national ASEE conference.

These findings contributed to conversations held by the SCC Executive Board regarding plans for the upcoming year 2009-2010. Some of the initiatives that came out of those conversations include an information and recruitment campaign, discussions with the New Engineering Educators division, and expanding student networking opportunities.

Acknowledgements

The authors wish to thank Tim Manicom for his assistance in providing a list of ASEE student members. They also wish to thank the SCC Student Advisory panel (Ron Barr, Pat Fox, Letha Hammon, Carol Mullenax, and Marie Planchard) for suggesting the survey and for their continued guidance in helping the SCC grow and mature.

Bibliography

1. Mullenax, C. Student Involvement in ASEE – Past, Present, and Future. *2005 ASEE Annual Conference Proceedings*. 2005.
2. Ibid.
3. ASEE Student Constituent Committee Bylaws. Online at: http://students.asee.org/?page_id=10
4. ASEE Student Chapter Startup Guidebook. Online at: <http://students.asee.org/wp-content/pdfs/ASEE-StudentChapterGuidebook.pdf>
5. Gibbons, M.T. 2008 Profiles of Engineering and Engineering Technology Colleges. Online at: <http://www.asee.org/colleges>