Engaging ASEE Student Membership through the Creation of a Student-Inclusive ASEE Conference Program

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Abstract

ASEE student membership has grown in recent years, while the professional membership has been in decline. It is critical for ASEE and its divisions to consider new ways to engage the growing ASEE student member population to improve the likelihood of retaining these students as future professional members in the society. Previous studies indicate that students see ASEE as an avenue for fulfilling their professional development needs. A needs analysis of ASEE student members was conducted to inform the creation of a student-inclusive ASEE conference program. The analysis identified high priority professional development needs (e.g., grant & proposal writing, college teaching, and navigating the job market) of student members and possible ways for ASEE to meet these needs (e.g., foster student programs, provide student opportunities, and build community). The results informed the creation of the 2014 Student Division conference program, which is presented in this paper to serve as a model for student-inclusive ASEE conference programming. Student-inclusive ASEE conference programming may be one mechanism to further engage student members and encourage them to continue as professional members in the society.

Introduction

The American Society for Engineering Education (ASEE) has seen an approximately 20% growth in its student membership since the creation of the Student Division (SD) in 2007. This growth coincides with the rise in engineering education degree programs and on-campus exposure to ASEE through local student chapters.[1]

ASEE student membership currently exceeds the Global, K-12, Retired and Life membership types within ASEE; a significant change from 2011 when the membership had surpassed only the Life membership type.[1] Students comprise between 1% (Engineering Technology) and 22% (Engineering Leadership Development Constituent Committee) of the division memberships, which is substantially less than the 83% student representation within the SD in June 2013. The majority (88%) of divisions have less than 11% student members. These statistics could be attributed to a number of factors, including interest and a lack of student-specific programming by each of the ASEE divisions.

The population of ASEE student members represents an obvious group of potential future professional members of ASEE. It is critical with the recent decline in ASEE professional membership (7% decline since 2007) that ASEE and its divisions consider new ways to engage the growing population of ASEE student members in an effort to encourage these students to persist as professional members. The following paper will not provide evidence that positive experiences for students will equate to continued membership beyond their student membership. Instead, it will suggest ways to meet student professional development needs as one mechanism to increase engagement of the student members of ASEE. We believe these efforts could ultimately have a positive impact on retaining student members as professional members.

Previous studies indicate that students join ASEE to support their professional development, primarily on recommendation from their advisors and mentors.[1-2] ASEE can facilitate faculty's continued support in encouraging students to join ASEE and/or bring students with them through the 'Bring a Student' program by offering more and improving current professional development opportunities for students.

This ASEE SD initiated research study was conducted to understand student professional development needs and priorities as well as consider ways to meet these needs. The research questions explored in this study were:
1. What are the professional development needs of ASEE student members?
2. How do student members rank the importance of their professional development needs?
3. What are effective ways to meet the professional development needs of ASEE student members?

Understanding the needs and priorities of current ASEE members and ways to meet their current needs can assist ASEE divisions in making informed decisions towards creating student-inclusive ASEE programming at the Annual Conference and Exposition. The results of this study hope to shed light on how to increase engagement of student members with the end goal of impacting the likelihood that students become professional members.

Methods

A survey research design was used to identify the professional development needs of ASEE student members as well as ways to successfully meet those needs.

Data collection

Data was collected for this study using a 14-item online survey that consisted of categorical, Likert-type (scale length: 1-4), rank-order (scale length: 1-8 or 1-11, depending on number of items ranked) and open-ended items. The survey items were constructed using a student needs analysis from the faculty perspective[3]. Items included demographics of the participating student population (e.g. gender, ASEE division affiliations, university, department affiliation, education level and expected graduation date), feedback on current ASEE student offerings (e.g. student paper and poster sessions), interest in desired professional development sessions (e.g. grant and proposal writing, college teaching and navigating the job market), and ways to engage student members in ASEE (e.g. fostering a student-focused conference program, building a community interested in student needs). Participants were recruited to voluntarily respond to the survey through the SD listserv in early 2013. Current membership in SD includes 470 members of whom 17% are non-student professional members. The SD membership was chosen as the sample because it is a direct option of contacting a large percentage of the overall ASEE student population (approximately 48%) and includes professional members interested in fostering programs for ASEE student members.

Participant demographics

The survey received a response rate of 13% (n = 57) with 47 completing the entire survey (81% completion rate) and a range of item response rates between 14% and 98%. Responses from all 57 responses were tabulated in the Results section. Percentages and total number of respondents are noted to reflect response rates.

The majority of the respondents were university students (83%, n = 29), particularly advanced PhD students expecting to graduate in 2013 or 2014 (57%, n = 20). Respondents self-identified as follows: 1 self-identified as a PhD student and faculty/staff; 21 classified themselves as PhD students; 2 self-identified as PhD and masters students; and 3 as masters students. The remaining student sample consisted of 2 undergraduate students and 1 high school student. Five faculty/staff also responded to the survey. All responses were included in the analysis to represent the wide array of perspectives held by those supportive of student engagement in ASEE.

More females (54%, n = 30) than males (45%, n = 25) participated in this study (2% were genderqueer; n = 1). This is a shift from previous studies, where the sample was either equally split between the two genders or had a higher percentage of male respondents.[1-2] The higher percentage of female respondents is likely due to the high percentage of female members within SD (45%) as compared with other divisions.[4]

Little more than half (57%, n = 20) of the sample was affiliated with traditional engineering or engineering technology departments, while 40% (n = 14) were affiliated with STEM education and 31% (n = 11) belonged to an engineering education department. The current sample shows a slight decline in representation from traditional engineering or engineering technology departments and a slight increase in representation from engineering education departments when compared to previous studies.[1]

The majority of respondents have been affiliated with ASEE for only one to two years (40%, n = 22). The remaining respondents have been affiliated with ASEE for less than a year (24%, n = 13) or for more than two years (36%, n = 20). This overall trend is similar to that of a previous study.[1]

An examination of division affiliation outside of SD is illustrated in Table 1. The highest division affiliation was with the Educational Research & Methods Division (50%, n = 24). Multiple divisions were represented by 4-10% of the respondents. The list of top affiliated divisions was predominantly non-discipline specific divisions.

Many respondents identified affiliations with other engineering education-related student groups outside of ASEE. Affiliation with an ASEE student chapter topped the list with 82% (n = 32) of respondents selecting this option. This is a significant change (about 30% increase) from the previous study and is likely due to the increase in the number of ASEE Student Chapters.[1] Many respondents (31%, n = 12) also noted their involvement in the Graduate Engineering Education Consortium for Students (GEECS).

Table 1: Top 10 ASEE division affiliations by respondents (n = 48).

	Division	Response Percentage	Number of Responses
1	Educational Research and Methods	50	24
2	K-12 and Pre-College Engineering	25	12
3	First Year	23	11
4	Women in Engineering	21	10
5	Design in Engineering Education	15	7
6	Minorities in Engineering	13	6
7	Engineering Ethics	10	5
	Graduate Studies		
8	Civil Engineering	8	4
	Community Engagement in Engineering Education		
	Multidisciplinary Engineering		
	Two Year College		
9	Computers in Education	6	3
	New Engineering Educators		
10	Environmental Engineering	4	2
	Mechanics		
	Aerospace		
	Mechanical Engineering		
	Liberal Education/Engineering & Society		
	International		
	Entrepreneurship & Engineering Innovation		
	Biomedical Engineering		
	Electrical and Computer Engineering		

Results

The results section is divided into an examination of student members' professional development needs and possible solutions for how to meet those needs.

Professional development needs
Forty-seven respondents ranked professional development needs on a scale of 1-8 in eight different professional development areas. The professional development areas include: grant & proposal writing; college teaching; navigating the job market; leadership skills; communication skills; career counseling; service and outreach skills; and work-life balance. The proposed areas were based on results of a student needs analysis conducted from the faculty perspective.[3] The mean interest of respondents in the eight professional development areas is presented in Figure 1.

The majority of respondents are interested in developing their grant & proposal writing skills. Interest in grant & proposal writing is followed by interest in college teaching and navigating the

job market. Respondents indicated mid-level interest in developing leadership skills and communication skills and gaining career counseling. Respondents showed very little interest in developing service and outreach skills or work-life balance skills.
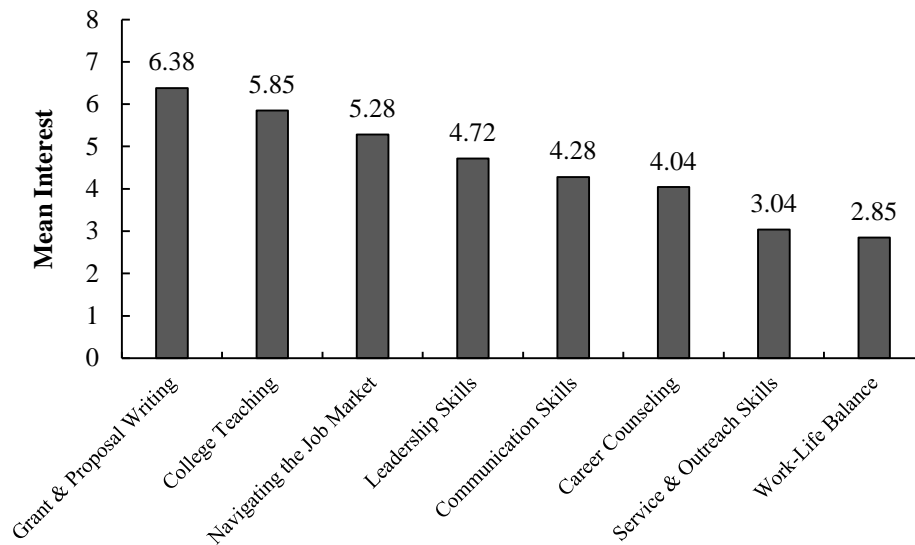

Figure 1: Mean interest of respondents (n = 47) in various professional development areas on a ranking scale from 1 to 8.

Forty-six respondents indicated interest in professional development topics within the eight ranked professional development areas (Table 2) on a Likert scale from 1 to 4. Respondents are primarily interested in topics related to research and job acquisition. Of lower importance were service related topics, work-life balance, public speaking, and navigating office politics. This order of ranking is similar to one seen in previous study on student expectations from a professional society in environmental engineering.[5]

Table 2: Mean interest of respondents (n = 46) in professional development topics (a-s) on a Likert scale from 1 (not at all interested) to 4 (very interested).

	Professional Development Topic	Mean Interest
a	Networking	3.59
b	Preparing grants & proposals	3.54
c	Developing research skills	3.50
d	Preparing for jobs in academe/Understand the job market	3.41
e	Introducing teaching-related innovations in the classroom	3.39
f	Preparing scientific publications	3.37
g	Interviewing skills & negotiating job offers	3.30
h	Developing a course	3.26
i	Technology in the classroom	3.24
j	Engaging in service & outreach activities	3.13
k	Reviewing scientific publications	3.11
l	Developing teaching portfolios	3.11
m	Developing collaborations & managing teams	3.07
n	Finding non-research related opportunities (industry, policy, etc.)	3.07
o	Managing diversity in the classroom	3.02
p	Starting a research lab/lab management	2.80
q	Work-life balance	2.78
r	Public speaking	2.67
s	Navigating office politics	2.61

Engaging student members
Forty-five respondents ranked different possible solutions to increase engagement within ASEE using a scale from 1 to 11 (Table 3). The possible solutions are aligned with the objectives of the Student Division.[6] Highly ranked methods to engage members included receiving information about scholarships, fellowships, and employment opportunities in engineering education, creating student-focused programs at national and regional ASEE conferences, and insights into academic careers and practices. These methods of engagement are similar in nature and ranking to those found in a previous study of student expectations from an environmental engineering professional society.[5]

Table 3: Methods to engage respondents (n = 45) in ASEE. Ranked on scale of 1-11.

	Method to engage student members	Mean importance
1	Inform ASEE student members of scholarships, fellowships, post-doctoral opportunities, and miscellaneous employment opportunities related to engineering education.	7.82
2	Foster programs for ASEE student members at regional and national ASEE meetings.	7.76
3	Provide opportunities for students to gain insight into academic careers and teaching practices.	7.51
4	Build a community of ASEE student and professional members interested in student interests and needs.	7.31
5	Promote the development of ASEE Student Chapters at local campuses	6.42
6	Develop ties between ASEE Student Division members and ASEE Professional members.	6.38
7	Develop collaborations between the ASEE Student Division and related ASEE Divisions including, but not limited to the New Engineering Educators Division and Graduate Studies Division.	5.44
8	Participate in local K-12 science, technology, engineering and mathematics (STEM) education activities/outreach.	4.98
9	Develop the next generation of ASEE leaders.	4.87
10	Support and inform undergraduate ASEE student members considering graduate school opportunities.	4.71
11	Develop international opportunities for ASEE Student Division members.	2.80

Discussion

The findings from our analysis provides a basis to make future suggestions for ASEE divisions and was foundational in the design of the 2014 SD Division conference program. The suggestions and changes made are based on respondent ranking of interest in professional development topics and methods to engage student members. Rankings in Table 2 are given prominence over rankings in Figure 1 while making suggestions for programming. This approach is taken because topical rankings (Table 2) give a more accurate impression of respondents' needs and priorities for professional development within the broad professional development areas (Figure 1). Respondents' desires and expectations from ASEE are inferred from respondents' rankings of different solutions for improving their engagement. A presentation of the 2014 SD conference program illustrates how SD used the results from this research to inform its programming for the 2014 ASEE Conference & Exposition in Indianapolis, Indiana. This program provides an example for other ASEE divisions.

Suggestions to ASEE divisions
Analysis of student professional development needs suggests the need to create a collaborative, student-inclusive conference program that promotes insight into academic careers and teaching practices through collaboration between different ASEE divisions. The focus of activities that divisions should consider include networking, grant and proposal writing, developing research skills, preparing for jobs in academe, and using teaching-related innovations. In the subsequent paragraphs, the authors provide examples of possible programming to engage students through the aforementioned activities. The examples given are intended to be mutually beneficial for professional members and student members at various points in their education.

ASEE divisions can offer multiple student-inclusive networking sessions at the conference. Currently, students have limited opportunities to network with professional members. SD usually hosts a happy hour in collaboration with New Engineering Educators division to provide a platform for networking between student and professional members. Student members would benefit from more discipline-focused divisions offering an increased amount of similar networking opportunities for their professional and student members since more than half of the respondents are affiliated with traditional engineering departments. Networking with professional members may also give student members an avenue to understand the job market from members in their disciplines.

ASEE divisions can also offer opportunities for career development to students at the conference. For example, divisions can offer grant and proposal writing workshops for their members Discipline-focused divisions can also connect student members with disciplinary members to collaborate on grants and proposals. Workshops or special sessions can focus on developing research skills on topics such as specific education-related research methods, tips and tricks for designing a research study, and how to think about the implications of a research study. Divisions can also host Distinguished Lectures or other sessions focusing on topics like introducing teaching-related innovations in the classroom. Other activities listed in Table 2 can also be considered by divisions whose vision aligns with the nature of these activities. Such opportunities can prepare students for careers in academe and help students see value in engaging with ASEE and divisions.

Offering a collaborative, student-inclusive program has the potential to strengthen ties between professional and student members, while building a larger community of members interested in students' needs. As seen in Table 3, these two factors are important for engaging student members on a wider scale in the society. Engaging students via the creation of a graduate student-inclusive program however may be ineffective if not well advertised to students. ASEE divisions should consider building or using successful common platforms, like Accelerator, to reach out to students throughout the year. ASEE may also choose to collaborate with SD to inform students of student-inclusive activities held at the conference and available as opportunities such as scholarships, jobs, etc. within divisions. The latter (as seen in Table 3) is of utmost importance to student members and a great way to connect students with ASEE divisions.

2014 SD conference program
The SD executive committee has created a student-inclusive SD conference program for the 2014 ASEE Conference & Exposition (Table 4) using the results of this study. The conference program aims to address high priority student professional development needs that can be traced back to Table 2. Engagement methods used for particular sessions can be traced back to those listed in Table 3. For example, the Student Social is a new opportunity for students to familiarize themselves with ASEE and SD leadership, network with professional members from all divisions and build a community with both student and professional members.

SD is offering multiple collaborative sessions including technical sessions, panels of invited speakers, and a distinguished lecture. Several social functions are also scheduled to allow students and professional members to interact with each other. The main collaborating divisions

include the New Engineering Educators (NEE), Entrepreneurship & Engineering Innovation (EEI), Liberal Education/Engineering & Society (LE/ES), Corporate Members Council (CMC), ASEE Headquarters (ASEE), College Industry Partnership (CIP), Cooperative & Experiential Education (CEE), Educational Research & Methods (ERM), Engineering Deans Council (EDC), Engineering & Public Policy and the Engineering Leadership Development Constituent Committee (ELDCC). This program can serve as a model for student-inclusive ASEE conference programming.

Table 4: Select programming from the 2014 Student Division Conference Program (Note: primary sponsor listed first). See 2014 conference session guide for non-listed sessions.

Session Name	Professional Development Topic	Engagement Methods	Sponsoring Division(s)
Technical Session - Industry Day: The Secrets of a Successful Global Capstone Program	e	2, 3, 7, 9	CMC, ASEE, CIP, CEE and SD
Technical Session - Industry Day: Best Practices for Sponsored Capstone Courses	e	2, 3, 7, 9	CMC, ASEE, CIP, CEE and SD
Panel: How to be a Successful Professional in Academe & Industry	a, d, j, q	2, 3, 7, 9	SD, NEE and CMC
Special Panel Session - GEECS as an Avenue for Networking, Collaborating, and Mentoring	a, d, m	2, 3, 4, 9	SD
Panel - So, You Wanna Present at ASEE?: An Assortment of Presentation Tips from Award-Winning Engineering Educators	r	2, 3, 7, 9	NEE and SD
Special Panel Session - The Role of Peer Review in the Development of Engineering Education	k	2, 3, 7, 9	LE/ES, ERM, SD, EPP
Student Division Poster Session	a, r	2, 6	SD
Distinguished Lecture - Inspiring Change Agents to Transform Engineering Education: Challenges & Strategies of Pioneers in an Ever-evolving Social & Cultural Context	e	2, 3, 7, 9	SD, NEE, EEI, EDC, and ELDCC
ASEE Student Chapters Officers' Meeting	N/A	5, 9	SD
Student Social	a	2, 4, 6, 9	SD
Student, Entrepreneurship and Engineering Innovation and New Engineering Educators Divisions Happy Hour	a	2, 6, 7	SD, EEI and NEE
Annual Student Division Dinner	a	2, 6, 7	SD

Conclusion & Implications

ASEE and its divisions have an opportunity to connect with the increasing student membership in the society by creating student-inclusive conference programming similar to that of the SD division. The proposed program, which is based on the results of a survey of professional development needs and possible solutions for meeting those needs, can serve as a first step toward engaging student members in ASEE. The authors expect the collaborative, student-inclusive program to extend the influence of ASEE divisions on student membership, while possibly impacting the society's future professional membership.

Acknowledgements

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