

Case Study: Professional Society Faculty Advisor Training Increases Student Engagement

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The American Society of Civil Engineers (ASCE) has invested significantly in developing and supporting student chapters, recognizing that student member engagement is key to transitioning into professional membership. Faculty and Practitioner Advisors (FAs and PAs) provide long-term mentorship and are integral to student engagement. Skills acquired outside the classroom are essential and ASCE student chapters provide members with engagement opportunities to practice what cannot be taught in the classroom. Further, many advisors take on the role out of obligation, often without fully realizing the personal and professional benefits it offers. To address this, ASCE launched the Practitioner and Faculty Advisor Training Workshop (PFATW) in 2000 to empower advisors to expand their professional networks, learn strategies for student chapter successes, and collaborate on solutions to common student chapter challenges. Faculty are provided with resources that they can take back to their universities to support their students better. At the end of the program, advisors are not only equipped with valuable information, but also gain a network of colleagues that they can reach out to for support and advice. Data comparing advisors who attended PFATW to those who did not, show an increase in student engagement and performance, as indicated by the chapter annual report score. Successful student chapters are supported by trained advisors that not only enhance student engagement experiences, but the quality of activities and competitions the chapter participates in.

Keywords: Student Success, Faculty Professional Development, Student Organizations

Introduction

Student chapters established by professional societies, like the American Society of Civil Engineers (ASCE), provide opportunities for students to network with industry professionals, gain exposure to various career options, develop leadership skills, and enhance their professional development beyond the academic experience. These activities collectively prepare students for a smoother transition into their professional careers after graduation. ASCE, established in 1852, is the oldest professional engineering society in the United States [1]. ASCE operates under a collection of volunteers associated with local or regional professional younger member groups/forums, branches, and sections that oversee student chapters. ASCE recognizes the vital role of students in its membership, as they represent a significant portion of the total membership and are essential to the society's future.

Student chapters have been a part of ASCE since the 1920s and are affiliated with colleges and/or universities. These chapters aim to accelerate the transition of student members into professional civil engineers by complementing academic learning with opportunities for personal and professional growth [1]. Through their involvement, students gain essential skills, including leadership and career readiness, while building professional networks and fostering civic engagement through various activities of engagement. Student involvement within professional student chapters provides unique opportunities on campuses for a variety of engagement activities. Many student organizations, including ASCE student chapters, are encouraged to engage in events such as participating in professional industry meetings, community service projects, field trips to civil engineering project sites, leadership development workshops, K-12 mentoring events, and engineering design competitions. These engagement experiences provide opportunities for students to elevate their sense of belonging, which research studies have linked to such positive outcomes such as self-efficacy [2], mental wellness [3], academic motivation [4], major satisfaction [5], grit [6], persistence and academic performance [7], [8], [9].

Most student chapters are typically required to be under the advisement of a faculty member of the institution/university/college. These faculty advisors (FAs) are crucial in establishing a culture for long-term mentorship, cultivating a variety of engagement opportunities, and providing administrative support within the institutional resources to help accomplish the mission of the chapter and society. Most ASCE student chapters also have practitioner advisors (PAs) made up of local industry professionals to enhance the networking potential for the students and partner with the FAs with the mentorship responsibilities.

There is a growing need for faculty and staff to advise student organizations. However, there is an inconsistency in the training provided [10]. To support the development of FAs and PAs, ASCE created the Practitioner and Faculty Advisor Training Workshop (PFATW), under the leadership of the Committee on Student Members (CSM) in 2000. PFATW equips FAs and PAs with the knowledge, tools, and resources needed to effectively support their student chapters. Participants in PFATW will:

- Understand ASCE's structure and the role of student chapters;
- Demonstrate best practices in serving as student chapter advisors;
- Recommend activities and strategies that promote chapter success;
- Evaluate and provide feedback on annual reports; and
- Expand their professional networks.

So far, through anecdotal observations, student organizations with FAs and/or PAs that participated in PFATW appear to have increased success in their student chapter. The success is documented annually by each student chapter in their annual report. The annual report is scored based on several criteria including:

- Student Chapter SMART Goals;
- Community Service and Outreach Activities;
- Meetings: Planning meetings, professional speakers, student presentations;
- Field Trips; and
- Collaboration with other organizations.

Engaged FAs and PAs contribute by sharing their experiences, including what strategies have worked well or fallen short for their student organizations, fostering a collaborative environment to enhance student chapter development. The main objective of this study is to show that student chapter annual report scores improve due to the attendance of a PA or FA to ASCE PFATW.

Background

Benefit for students

In the current climate of higher education student success is a key conversation topic. As students participate in activities beyond the classroom, they have a stronger educational experience and higher institutional satisfaction [11]. Student success can be attributed to the connection and access students have to faculty advisor(s) and other student members [12], [13]. These students develop practical competencies (i.e. soft or power skills) and build leadership that may not be included in their academic curriculum [14]. These skills can be practiced through student organizations. These organizations provide an opportunity to grow future leaders by offering opportunities to balance budgets, run meetings and events, organize people, and show passion. They practice professionalism through understanding responsibility, integrity, accountability, and excellence. They are career-ready because they can think beyond what is taught in the classroom. Students also have a chance to network with professionals, other student chapters, and peers at their home institution.

There is a clear link between a student's sense of belonging and retention/persistence within higher education [15], [16], [17], [18]. Meehan and Howells further state that the importance of a

social network through extracurricular involvement provides students with a clear sense of belonging [18]. In addition, involvement is key to reducing isolationism and guides students in their academic and social needs [14]. Involvement results in an opportunity to develop a positive relationship with one's advisors outside the classroom. These experiences could be perceived as being less intimidating to students. Students are provided with a connection to advisors beyond the classroom, and this could perhaps lead to faculty being perceived as less intimidating and more approachable which can lead to improved academic performance. Thus, faculty mentorship enhances academic confidence and self-efficacy [19], which plays a key role in fostering aspects of students sense of belonging [12]. Research suggests that interaction with faculty is one of the most important elements supporting the desire to continue studying engineering [20]. Extracurricular opportunities such as student clubs provide opportunities for peers to connect and build friendships that last a lifetime. Elevating a student's sense of belonging through involvement in student organizations appears to improve the overall academic experience leading to increased retention and preparedness for the workforce.

Benefit for Advisors

Taking on the role of an advisor can be challenging, as many individuals step into the position with limited guidance on how to extend their responsibilities beyond basic administrative tasks like approving financial transactions and signing paperwork. However, advisors are crucial in shaping student involvement in extracurricular activities [15]. By understanding the mentoring process, advisors can help identify and cultivate future leaders [21]. They serve as academic, professional and personal mentors, offering valuable guidance.

Effective advisors are relationship builders and credible institutional representatives, who foster meaningful connections with students eager for mentorship [22], [23]. Over time, the advisor-student relationship often evolves into a lasting bond. Advisors also act as advocates, addressing organizational challenges by proposing solutions and securing external resources, when necessary [24], [25], [26].

Active advising significantly contributes to a positive public perception of the student organization [27]. Student organizations typically operate with clear missions, visions, and tasks, and advisors are a pivotal role in supporting these efforts. As long-term fixtures within organizations, advisors offer consistency and expertise, a link to the institution and alumni, enabling them to support key functions such as group development and goal attainment, activity planning, and organizational maintenance [14], [23], [25]. Their institutional knowledge and experience provide essential support, helping student organizations achieve their goals.

When advisors have a personal connection with the organization, their experience is more rewarding [28]. The connection with their students is the primary incentive, even though they may not receive credit for all the time they provide [29]. There is a clear connection to the

service component of their academic portfolio, but it can also provide connections to the other activity and workload portions for faculty; teaching and research. Figure 1 illustrates how a commitment to advising a student organization can benefit the three common areas of faculty development [30].

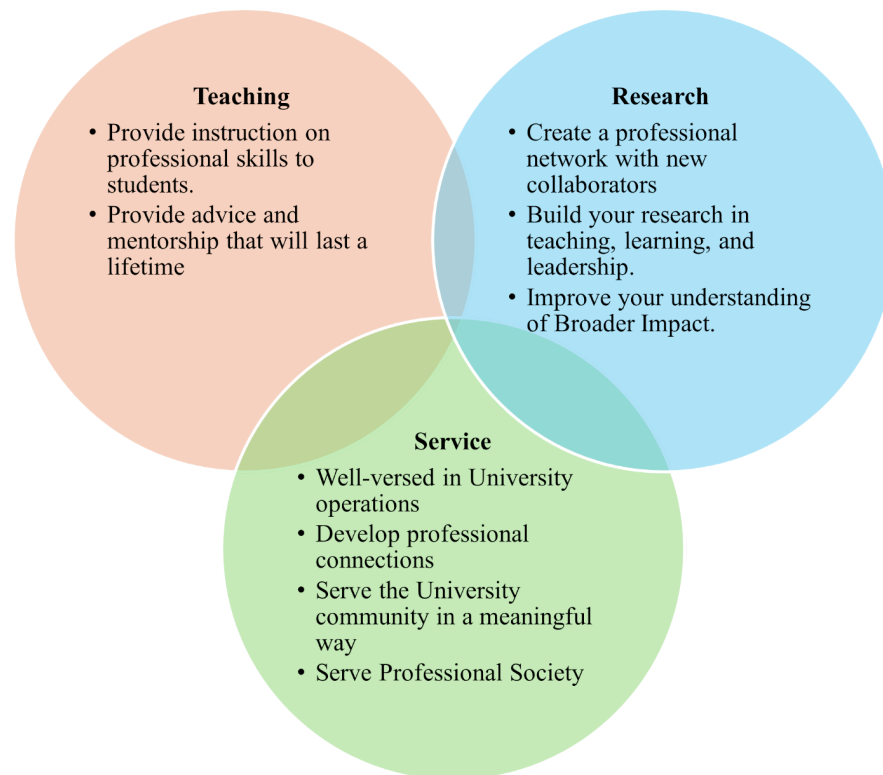


Figure 1 - Benefits of Student Advising to Faculty Professional Contributions [30]

Faculty Advisor Training

Professionals and faculty members actively participate in professional development opportunities that can help further their careers. These opportunities include technical and leadership training which has the potential to provide career advancement.

As industries evolve, new methods and software emerge to address complex challenges. To stay current, professionals regularly participate in short courses, conferences, and workshops. Faculty members can also take advantage of these opportunities, to bring fresh material and insights into the classroom but also to enhance their teaching skills. Programs aimed at improving instructional effectiveness include Centers for Faculty Development (available on most campuses), Future Faculty Development Certificates (offered at several universities), ASCE's ExCEED program, and many others.

To be competitive in a global economy, leadership training is essential. Training provides individuals with a competitive edge and the opportunity for promotion. Examples of training that are available include but are not limited to Emerging Leaders Alliance [31], Grainger Foundation Frontiers of Engineering program [32], and short courses through institutions of higher education (MIT Engineering Leadership, Cornell Engineering Leadership and many more). Several organizations also offer leadership training within their organizations. Universities also look to provide leadership training to faculty. This is essential as faculty are the future of administration in institutions of higher education. Examples of training opportunities include the ACE Fellowship program, HERS Leadership Institute and several others. These programs often include mentorship opportunities, case studies, and cross-functional project experiences. There are even programs that provide Coaching Certificates that provide people with the tools and resources to mentor others.

With all this training and the knowledge that student organizations have an impact on student retention and persistence in higher education, there should be formal training for advisors to become student organization advisors. Many advisors feel ill-equipped and have little to no preparation to advise student organizations [24], [33]. Much of their knowledge was experiential. Most universities have an advising handbook [26], but there is a lack of training to be an advisor. To provide members with value ASCE offers a wide variety of educational programs, events, courses, conferences, and more [34]. By ensuring successful student chapters those members will matriculate into being professional members of the society, ASCE saw a need for training FAs and PAs of student chapters. ASCE developed the Practitioner and Faculty Advisor Training Workshop (PFATW) around 2000, which has been offered in various forms and nearly annually since, depending on funding. The goal of the workshop is to provide FAs and PAs with training to support student chapters. In addition, the workshop offers an opportunity for like-minded individuals to collaborate and develop professional connections.

ASCE student chapters provide opportunities for students to participate in activities that increase a sense of belonging leading to success in and out of the classroom. Intuitively, well-equipped and involved advisors can lead to healthier student chapters that provide a variety of opportunities for students to engage. This paper works to provide evidence suggesting the development of Faculty Advisor Training leads to student chapter success.

Methodology

Attendance of PFATW Data - With the development and consistent commitment of the PFATW for the past 25 years, there are rosters of attendants that were collected to associate the FAs and PAs with specific student chapters. Traditionally, staff members from ASCE Student Programming contacted FAs and PAs to invite them to participate in the training program. When PFATW was first developed ASCE provided stipends to support attendance to the in-person workshop at the ASCE Headquarters in Reston, Virginia. Due to the reduction of budget,

PFATW has been occasionally held in conjunction with one of the three Workshop for Student Chapter Leaders (WSCLs) held regionally. WSCL is a training workshop for students, where faculty advisors are encouraged to attend with their students. The invitees were those who were already planning to attend, and thus attendance was based on advisors who were likely already active and in less need of training. In addition, there was no funding for travel, so faculty without other means of financial support were unable to attend. In 2021 and 2022, due to the global pandemic, ASCE discontinued many of their in-person workshops, including PFATW (2020 PFATW was held in January 2020, before the pandemic gathering restrictions). However, the Committee on Student Membership (CSM) did provide similar workshops virtually in 2021 and 2022. While the information was disseminated, group discussions and interactions were limited, reducing the opportunity for building community. In 2023, PFATW was hosted again in Reston, Virginia however, due to budget constraints stipends were not provided to participants. With the lack of financial support, FAs and PAs self-select to attend and thus this is not a random sample. Table 1 summarizes the number of FAs and PAs that have participated in PFATW since 2010. Due to staff changes, data before 2010 is unavailable.

Table 1 - PFATW Attendance

Year	PFATW Location	Type	Number of Attendees	
			FA	PA
2000-2009	Reston, Virginia	In-person	Unknown	
2010	Reston, Virginia	In-person	23	12
2011	Reston, Virginia	In-person	17	11
2012	Reston, Virginia	In-person	22	10
2014	Reston, Virginia	In-person	19	24
2015	Reston, Virginia	In-person	19	15
2017	Reston, Virginia	In-person	11	7
2018	Orlando, FL	WSCL	9	6
2020	Burlingame, CA	WSCL	13	9
2021	Virtual		Unknown	
2022	Virtual		Unknown	
2023	Reston, Virginia	In-person	8	5

This data is used to track which student chapters had a FA, PA or both participate in the workshop since 2010, excluding 2021 and 2022.

Annual Report Data - Each year student chapters within ASCE are expected to submit an annual report to provide a summary of activities, and accomplishments, which allows them to reflect on how the chapter might improve in the future. The reports include a presentation of events with required sections. These reports are evaluated by members on ASCE CSM and scored based on a rubrics and a system of points associated with the various types of activities. Based on a student chapter's annual report scores, the chapter becomes eligible to participate in the National ASCE Competitions (Concrete Canoe, etc) and eligible to receive awards from ASCE. A student chapter that has been in existence for at least 5 years can choose to submit an “EZ report”, which is a simplified summary report for chapters that are not as active and/or are not interested in participating in the ASCE National Competitions. Several student chapters have not submitted reports as well. These chapters are communicated with and encouraged to have the students, and the advisors attend training programming offered by ASCE to re-engage. In 2019, ASCE incorporated a data collection online tool that allows reviewers to score directly within the portal and allows students to submit directly. This allowed ASCE to collect and store all data and comments. A presentation is still required to be submitted along with the data entry into the online reporting tool. Data from 2018 was uploaded into the portal to allow for a comparison between the old (2018 scores) and new methods (2019 scores), so data before 2018 is not available. Table 2 provides a summary of the number of student chapters in existence and the annual report submitted.

Table 2 – ASCE Student Chapter Annual Report Submissions

Year	Total Number of Student Chapters	Annual Report Submission	Percentage Annual Report Submission
2018	356	299	84%
2019	371	314	85%
2020	384	312	81%
2021	397	339	85%
2022	412	367	89%
2023	427	381	89%

Qualitative Analysis - This is a quantitative research study that involves collecting numerical data and conducting mathematical analyses to observe trends and test hypotheses. Data was

collected to determine who participated in PFATW as mentioned previously. The annual report scores were categorized based on whether a PA/FA attended PFATW since 2010.

Results and Discussion

The data collected from ASCE included the FAs and PAs, and the institutions they were affiliated with, who participated in the PFATW from 2010 to 2018. Additionally, annual report scores were collected for all institutions between 2018 and 2023. These datasets were then quantitatively synthesized to determine whether a FA and/or PA attending the PFATW contributed to better annual report scores for their related student chapters. The student chapters which submitted an annual report between 2018 to 2023 were coded as sending a FA, sending a PA, sending at least one advisor (regardless of type), sending both (both a FA and a PA) or sending no one to PFATW.

The annual report scores were averaged and summarized in Table 3 and Figure 2. Figure 2 shows the effect of having at least one advisor attending PFATW (regardless of type) is noticeable in the average scores of the annual reports when compared to none attending (around 7 points more). Also, the figure shows that having both advisors attend is better on average when compared to having only FAs or only PAs attend (around 2 points more).

Table 3 - Average Annual Report Scores from 2018 to 2023 based on PFATW Attendance

Status	Average Scores					
	2018	2019	2020	2021	2022	2023
Both Attended	58.9	57.5	40.1	40.2	45.9	51.3
FA Attended	60.8	54	39.1	38.7	43.2	49.5
PA Attended	63.6	53.1	40	37.6	45.6	47.1
At least 1 Attended	61.8	53.2	39.2	38	43.7	48.2
None Attended	52.2	46.9	35.9	35.3	37.3	39.3

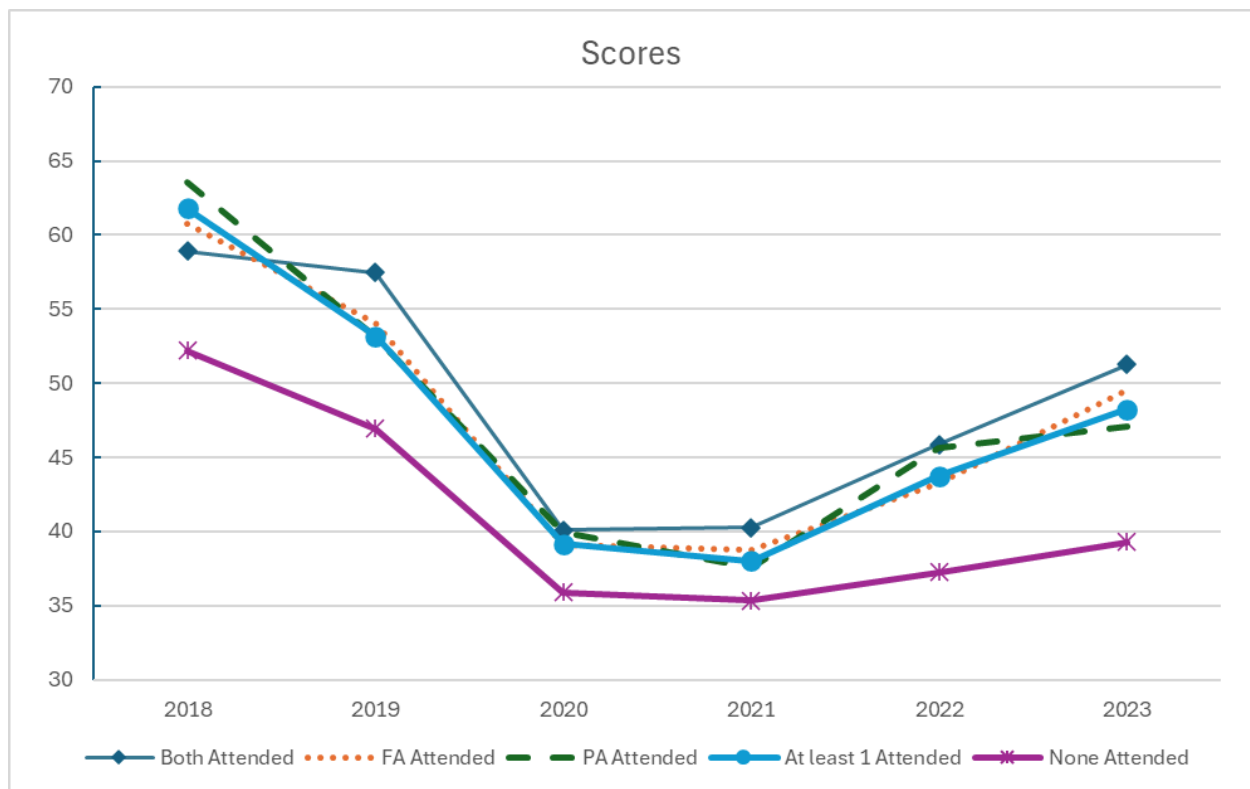


Figure 2 - Average Annual Report Scores from 2018 to 2023 based on PFATW Attendance

Overall the results of the data indicated that by having advisors attend PFATW clearly show improvements in the student chapters annual report score. However, the new online tool was first implemented in 2019. There is a clear dip in the annual report scores, which are attributed to students and reviewers (ASCE Committee on Student Members) not completely understanding the new reporting tool. During 2020 and 2021 a global pandemic was underway causing most universities across the nation to restrict or cancel meetings in person starting in March of 2020. The impact on the ASCE Student Chapters is reflected in the annual report scores. It is interesting to note that over 80% of schools still submitted their annual report (Table 2).

Figure 3 provides a detailed review of the data only from 2021 to 2023 showing the increased annual report scores recovering from the pandemic and showing the data for at least one advisor attended vs. none attended. The difference in that period changes from 2.7 in 2021 to 9.0 points in 2023. The y-axis represents the annual report score, and the x-axis represents the year submitted.

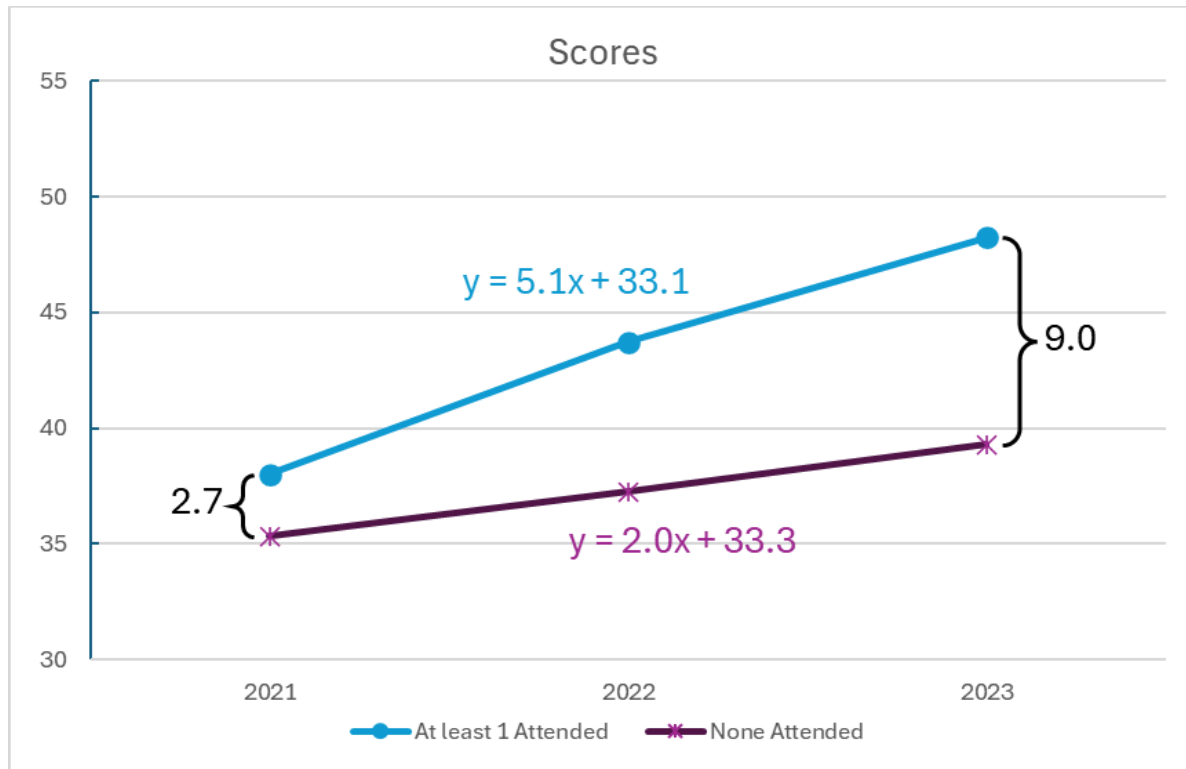


Figure 3 - Growth in Student Chapter Health based on Annual Report Score Post-Pandemic

Advisors attending PFATW have a clear effect on the annual report score averages. In addition, the student chapter scores are improving at different rates, where having at least one advisor attending has 3.1 points more per year coming out of the pandemic when compared to none attended. There is a clear difference in the upward trend for chapters that have had advisors attend the training workshop, indicative of the health of the chapters being related to how equipped advisors are.

Another important aspect to highlight is the relation between having any type of advisor attending the PFATW with the student chapter submitting their full annual report (instead of only completing the EZ-Report or not submitting any report). From the year 2010 to the year 2018, 135 distinct student chapters were represented in the PFATW (with 205 attendees in total). Out of those 135 student chapters Table 4 shows the percentage of chapters that submitted their annual report each year. Surprisingly and contrary to the original hypothesis, participation in PFATW resulted in lower rates of annual report completion (around 9% less on average).

Table 4 - Percent of Student Chapters that Submitted their Annual Report

Status	Year				
	2019	2020	2021	2022	2023

Advisor attendance of PFATW	80%	74%	76%	82%	85%
Advisor non-attendance of PFATW	87%	84%	88%	92%	91%

Although these data appear to present a conclusion contrary to the previously presented results, other factors might exist that require additional investigation, such as faculty advisor turnover or the interest of the chapter to participate in the National Competitions causing the submission of the annual report to be less important by the student chapter and advisors.

Conclusion

Thanks to several years of training, the ASCE Committee on Student Members has truly brought a positive change to student organization success. By offering training to FAs and PAs, student chapters are making a greater contribution within their communities and the professional development of their members. This is seen by the 6 to 8-point average annual report score increase between having FAs/PAs attend training versus not attending training. The annual report is a key indicated to active and engaged student organizations. Thus, ASCE is helping create a sense of belonging for their student members by supporting FAs and PAs. This increased engagement is likely to lead to improved academic success as well as better-prepared engineering graduates entering the workforce. Further, professional societies will likely see an increase in the transition from student to professional membership.

The authors of this paper value student organizations and engagement with students beyond the classroom. The authors are working to show that being a Faculty Advisor can go beyond service. In addition, there is anecdotal evidence that investing in student chapters helps professional societies grow their future professional membership. By tracking the return on investment, the authors hope that professional societies will increase their investment in higher education.

References

- [1] ASCE CSM, "ASCE Student Chapter Handbook." American Society of Civil Engineers, Dec. 2021.
- [2] T. M. Freeman, L. H. Anderman, and J. M. Jensen, "College freshmen at the classroom and campus levels," *The Journal of Experimental Education*, vol. 75, no. 3, pp. 203–220, 2007, doi: <https://doi.org/10.3200/JEXE.75.3.203-220>.
- [3] M. Gopalan and S. T. Brady, "College students' sense of belonging: A national perspective.," *Educational Researcher*, vol. 49, no. 2, pp. 134–137, 2020, doi: <https://doi.org/10.3102/0013189X19897622>.

- [4] C. G.-O. Neel and A. Fuligni, "A longitudinal study of school belonging and academic motivation across high school," *Child Development*, vol. 84, no. 2, pp. 678–692, 2013, doi: <https://doi.org/10.1111/j.1467-8624.2012.01862.x>.
- [5] S. Hurtado and D. F. Carter, "Effects of college transition and perceptions of the campus racial climate on Latino college students' sense of belonging," *Sociology of Education*, vol. 70, no. 4, pp. 324–345, 1997, doi: <https://doi.org/10.2307/2673270>.
- [6] D. Verdín, A. Godwin, A. Kim, L. Benson, and G. Potvin, "Understanding how engineering identity and belongingness predict grit for first-generation college students," presented at the CONECD—The Collaborative Network for Engineering and Computing Diversity Conference, Crystal City, VA., 2018. [Online]. Available: <https://peer.asee.org/29589>
- [7] G. M. Davis, M. B. Hanzsek-Brill, and D. H. Robinson, "Students' sense of belonging: The development of a predictive retention model," *Journal of the Scholarship of Teaching and Learning*, vol. 19, no. 1, 2019, doi: <https://doi.org/10.14434/josotl.v19i1.26787>.
- [8] L. R. M. Hausmann, J. W. Schofield, and R. L. Woods, "Sense of belonging as a predictor of intentions to persist among African American and white first-year college students.,", *Research in Higher Education*, vol. 48, no. 7, pp. 803–839, 2007, doi: <https://doi.org/10.1007/s11162-007-9052-9>.
- [9] R. M. Marra, K. A. Rodgers, D. Shen, and B. Bogue, "Leaving engineering: A multi-year single institution study," *Journal of Engineering Education*, vol. 101, no. 1, pp. 6–27, 2012, doi: <https://doi.org/10.1002/j.2168-9830.2012.tb00039.x>.
- [10] ACPA, "Advisor Manual." Commission for Student Involvement, NA.
- [11] D. Abrahamowicz, "College involvement, perceptions, and satisfaction: A study of membership in student organizations," *Journal of College Student Development*, vol. 29, no. 3, pp. 233–238, 1988.
- [12] P. O'Keeffe, "A sense of belonging: Improving student retention," *College Student Journal*, vol. 47, no. 4, pp. 605–613, 2013.
- [13] D. Yarbrough, "The Engagement Model for Effective Academic Advising with Undergraduate College Students and Student Organizations," *Journal of Humanistic Counseling, Education and Development*, vol. 41, no. 1, pp. 61–68, 2002.

- [14] N. W. Dunkel, J. H. Schuh, and N. E. Chrystal-Green, *Advising student groups and organizations*, 2nd Edition,. San Francisco: Jossey-Bass, 2014.
- [15] A. W. Astin, "Student Involvement: A Developmental Theory for Higher Education," *Journal of College Student Personnel*, vol. 25, no. 4, pp. 297–308, 1984.
- [16] E. T. Pascarella and P. T. Terenzini, *How College Affects Students : A Third Decade of Research*, 2nd Edition. San Francisco: Jossey-Bass, 2005.
- [17] J. W. Everett and P. D. Zobel, "Promoting student connections and retention through an on-campus residential learning community for first-year underrepresented and low-income students," presented at the 2012 ASEE Annual Conference & Exposition, 2012, p. 25.1088.
[Online]. Available:
<https://peer.asee.org/promoting-student-connections-and-retention-through-an-on-campus-residential-learning-community-for-first-year-underrepresented-and-low-income-students>
- [18] C. Meehan and Kristy Howells, "What really matters to freshers?": evaluation of first year student experience of transition into university," *Journal of Further and Higher Education*, vol. 42, no. 7, pp. 893–907, 2018.
- [19] C. M. Vogt, "Faculty as a Critical Juncture in Student Retention and Performance in Engineering Programs," vol. 97, no. 1, pp. 27–36, 2008, doi:
<https://doi.org/10.1002/j.2168-9830.2008.tb00951.x>
- [20] J. J. Park, Y. K. Kim, K. Lue, and R. M. Parikh, "What's Next? Soon-to-Be STEM Graduates on Their Post-Graduate Plans," *Research in Higher Education*, vol. 63, no. 8, pp. 1346–1367, 2022, doi: <https://doi.org/10.1007/s11162-022-09685-9>.
- [21] K. A. Renn, "LGBT student leaders and queer activists: Identities of lesbian, gay, bisexual, transgender, and queer identified college student leaders and activists," *Journal of College Student Development*, vol. 48, no. 3, pp. 311–330, 2007.
- [22] S. Boatman, "Strong Student Government...and Their Advisement," *Campus Activities Programming*, vol. 20, no. 9, pp. 58–63, 1988.
- [23] A. Droste, J. Graves, R. Hill, B. Snyder, and H. Wendel, "Student-Faculty Interactions in Context: A Study of Faculty Advisors and Student Organization Advisees," *Journal of the Student Personnel Association at Indiana University*, pp. 54–71, 2006.
- [24] K. C. Petress, "The multiple roles of an undergraduate's academic advisor," *Education*, vol. 117, no. 1, pp. 91–93, 1996.

- [25] M. D. Evans, D. M. Evans, and L. Sherman, "Seven Keys to a Successful ASCE Student Chapter or Club: Guide for Student Leaders and Faculty Advisors," *Journal of Professional Issues in Engineering Education and Practice*, vol. 127, no. 2, pp. 65–74, 2001.
- [26] J. H. Schuh, S. R. Jones, S. R. Harpr, and S. R. Komives, *Student Services : A Handbook for the Profession.*, 5th ed. F. San Francisco: Jossey-Bass, 2011.
- [27] L. A. Patton and F. A. Bonner II, "Advising the Historically Black Greek Letter Organization (HBGLO): A Reason for Angst or Euphoria?," *National Association of Student Affairs Professionals Journal*, vol. 4, no. 1, pp. 17–30, 2001.
- [28] J. Wilson, "Volunteering," *Annual Review of Sociology*, vol. 26, no. 1, pp. 215–240, 2000.
- [29] M. J. Cuyjet, "Chapter Nineteen." *Student Services: A Handbook for the Profession*. 1996.
- [30] S. C. Shah-Fairbank and E. Steward, "Your Role as a Faculty Advisor," presented at the ASCE Committee on Student Members, Virtual, 2024. [Online]. Available: https://players.brightcove.net/75114961001/JJRfM4QskN_default/index.html?videoId=6362559977112
- [31] Emerging Leaders Alliance, "Emerging Leaders Alliance," Emerging Leaders Alliance. Accessed: Jan. 10, 2025. [Online]. Available: <http://emergingleadersalliance.org/about-ela/>
- [32] "Grainger Foundation Frontiers of Engineering," *Frontiers of Engineering*. Accessed: Jan. 10, 2025. [Online]. Available: <https://www.naefrontiers.org/Home.aspx>
- [33] B. E. Myers and J. Dyer, "Attitudes, Value, And Preparation Of University Faculty And Administrators For Advising," *Journal of Agricultural Education*, vol. 46, no. 3, pp. 35–46, 2005, doi: <https://doi.org/10.5032/jae.2005.03035>.
- [34] ASCE, "American Society of Civil Engineers," *Explore Education*. Accessed: Jan. 10, 2025. [Online]. Available: <https://www.asce.org/education-and-events/explore-education>