ASEE AMERICAN SOCIETY FOR ENGINEERING EDUCATION

Paper ID #40755

Disaggregating data from peer-led, small group discussion workshops for engineering and computer science undergraduates: Examining 'belonging' and 'mentorship' outcomes for underrepresented student populations

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Abstract

Creating a sense of belonging early in the undergraduate experience improves retention and learning outcomes as students develop their professional identity. Much of this research has been done in STEM fields because retention statistics show that students, particularly minoritized groups, leave STEM fields like engineering and computer science at higher rates than other STEM and non-STEM disciplines. Peer-led, content-based supplemental courses have frequently been shown to improve the academic outcomes for all students and provide community for students enrolled in large introductory courses. This research builds on our recent preliminary analysis showing that students who participate in peer-led group discussion workshops run by trained peer facilitators gain greater content understanding as well as confidence and a sense of belonging. Combining the percentage of students who either agreed or strongly agreed, 90% of students in workshop courses felt respected, greater than 70% of students reported an increased sense of belonging to the University community, and more than 80% of students gained mentorship from facilitators running the workshop courses. These optimistic outcomes are an excellent starting point from which to compare data for different demographic groups enrolled in these courses. Disaggregating outcomes data based on underrepresented student identities provides information with which we can improve peer educator training to increase engagement and continue to reduce systemic inequality faced by these groups. This IRB approved research examines: 1) the relative representation of student demographic groups in peer-led workshops, 2) whether perception of belonging and mentorship in workshops are similar for students among different demographic groups, and 3) the effect of the intersection of workshop facilitators' identities and identity of students in the workshops on indicators of a sense of belonging. To examine these questions, we use University collected demographic data from enrollment, and Likert-scale data collected from mid-semester evaluations of the peer-led workshop courses for 3 semesters beginning in Spring 2022 and ending in Spring 2023. As a group, female students are overrepresented in workshops relative to the general student population. Black and Hispanic students are also overrepresented in workshops relative to the overall course population, while Asian student enrollment in workshops is slightly lower in proportion to their representation in the corresponding lecture population. When examining the disaggregated survey data some interesting trends were found with males more likely to give the highest rating to questions about the workshop courses improving confidence and that groupwork helped them learn the material better. Furthermore, we found that Hispanic students in our study were more likely to give the highest rating to their facilitators for showing concern, dividing time equitably, and providing mentorship. On the other hand, Asian students were much less likely to give the highest rating for each of those questions. Additionally, we did not find a statistically significant effect when examining the intersection of facilitator and student racial and gender identities on sense of belonging. Overall, emergent patterns from this paper show that we have made great progress

towards creating inclusive learning communities that support all students across genders and ethnicities.

Introduction

Despite the high rate of growth in science, technology, engineering, and mathematics (STEM) jobs and the increasing prevalence of initiatives aimed at broadening participation, data continue to show persistent gaps in degree attainment and workforce representation for several groups who have been historically marginalized in computer science and engineering fields [1], [2]. With systematic and structural biases continuing to marginalize women and minorities seeking STEM degrees [3], we fail to achieve the level of diversity needed for today's STEM workforce.

In thinking about overcoming these systemic and structural issues, we consider the role that peer-led workshop "experience" plays in helping to create an inclusive learning environment as this is key to encouraging enrollment and persistence. The Computer Science (CS) field has created a framework to evaluate equity-based interventions by looking at the intervention's ability to grow *Capacity* to serve a more diverse CS student population, improve *Access* to the CS field, increase *Participation* in CS degree programs, and finally enhance the *Experience* (CAPE framework) of students in these programs [4]. The CAPE framework can be extended to other STEM disciplines as well, and we are particularly positioned to focus on the student experience within our College of Engineering.

Examining the student experience can be difficult, however recent research has attempted to unpack the components of the 'experience' variable, emphasizing that not only do types of social and academic experiences vary greatly, but there appear to be substantive differences in how those experiences influence different populations of STEM students [5], [6]. STEM students in physics, engineering, math and computer science tend to have busy and challenging academic schedules that may not allow for more traditional efforts to create social belonging and integration. One solution may be to integrate a greater emphasis in creating belonging into academic curricula and co-curricular opportunities. For the purposes of this paper, we will focus on a subset of student experiences in engineering education at Cornell University: specifically, how co-curricular, supplemental, peer-led workshops can positively contribute to the 1st and 2nd year experience for engineering students.

Cornell University's College of Engineering has offered a version of these co-curricular courses, called Academic Excellence Workshops (AEWs) since 1993. Increasingly we are focusing on the critical role these peer-led, content-based workshops play to create a sense of belonging and connectedness for participants. As stereotype threat and performance burden leads to educational outcome disparities at elite institutions like Cornell [7], [8] these workshops can play a crucial role in providing an increased sense of belonging within the context of an academically enriching experience. This sense of belonging and community (affective domain) plays a critical role in promoting learning and achievement (cognitive domain) [9].

Our recent preliminary analysis showed that students who participate in peer-led group discussion workshops run by trained peer facilitators gained a sense of belonging. Over 90% of

students in workshops responded (agreed or strongly agreed) that they felt respected, greater than 70% of students reported an increased sense of belonging to the college community, and more than 80% of students gained mentorship from facilitators running the workshops [10]. However, to understand the impact we are having (or not having) on creating an inclusive environment for those students typically marginalized by STEM programs, we need to disaggregate these data.

Disaggregating outcomes data based on underrepresented student identities provides information with which we can improve peer educator hiring and training to increase engagement and continue to reduce systemic inequality faced by these groups. This IRB approved research (Protocol Number: IRB0144303) examines the following research questions (RQs):

> ***RQ1*** *What is the relative representation of student demographic groups in peer-led workshops?*
>
> ***RQ2*** *Is perception of belonging and mentorship in workshops similar for students among different demographic groups?*
>
> ***RQ3*** *Does the intersection of workshop facilitators' identities and identity of students in the workshops impact the perception of belonging and mentorship in workshops?*

Methods

To examine these questions, we use University enrollment and demographic data, and Likert-scale data collected from mid-semester, peer-led workshop evaluations for 3 semesters beginning in Spring 2022 and ending in Spring 2023. Because mid-semester evaluations tend to have very high percentages of 4 and 5 ratings for all questions, we chose to take a conservative approach. In our analyses we created a binomial dataset, and we compare the likelihood of receiving a score of 5 versus receiving a score of 1,2,3 or 4 for each of the survey questions. The rationale here is that when students score a peer lower than a 5, there is some level of satisfaction missing.

Data Collection

Data for **RQ1** was collected using University-collected gender and race/ethnicity data for students enrolled in AEW for the full term compared to College of Engineering Admissions statistics. The College of Engineering admissions data does not include typical pre-fall and spring semester student reductions, so our numbers may underestimate the proportion of students enrolled in these workshops. We also examine the workshop enrollment data compared to the corresponding lecture enrollment data. Table 1 shows the number of workshop courses over this period and the University courses they are paired with.

Table 1. The total number of workshop courses offered and the corresponding lectures they were paired with during the three-semester period analyzed.

Lecture Course Code	Name of Lecture Course	Number of Workshop Courses Offered
CHEM 2090	Engineering General Chemistry	12
CS 1110	Introduction to Computing Using Python	10
CS 1112	Introduction to Computing Using MATLAB	3
CS 2110	Object-Oriented Programming and Data Structures	7
CS 2800	Discrete Structures	10
CS 3110	Data Structures and Functional Programming	4
CS 3410	Computer System Organization and Programming	2
MATH 1910	Calculus for Engineers	7
MATH 1920	Multivariable Calculus for Engineers	21
MATH 2930	Differential Equations for Engineers	9
MATH 2940	Linear Algebra for Engineers	7
Total Number of Workshop Courses Offered Spring 2022, Fall 2022, and Spring 2023		92

To address **RQ2** and **RQ3**, data analyzed in this study were collected from two surveys administered to students who were enrolled in AEW during Spring 2022, Fall 2022, Spring 2023 semesters. These data are collected every semester as a formative feedback tool for peer educators who design and facilitate the workshops and to assess the experience of enrolled students. Table 2 shows the experience level of the facilitators included in the data analyzed for this study.

Table 2. The proportion of facilitators that were employed in 1, 2 or 3 semesters included in this study.

Number of semesters	Number of facilitators who facilitated for this number of semesters.	% of facilitators working for 1,2 or 3 semesters
1	88	67
2	32	24
3	12	9
	132	facilitators in the database

Gender and ethnicity for enrolled students and facilitators exported from the College enrollment database and merged with respondent and facilitator identification numbers in the survey. The database categorizes students as “Male” or “Female” for the purposes of gender based on student application data. While students could identify as several other ethnicities (International, Multicultural – Underrepresented Minority, Multicultural – Non-Underrepresented Minority, Native American/Alaskan Native, Native Hawaiian/Other Pacific Islander, Other) we analyzed responses for only 4 reported ethnicities due to having a large enough sample size from which to draw conclusions: Asian/Asian-American (referred to as ‘Asian’ hereinafter), Black/African-American (‘Black’ hereinafter), Hispanic/Latine (‘Hispanic’ hereinafter), and White. Responses rates per facilitator of each ethnicity were not significantly different in any semester. Apparent

differences in the number of total responses by facilitator ethnicity was due to significantly fewer Black and Hispanic facilitators in each semester (Table 3).

Table 3. Breakdown of the number of facilitators by ethnicity each semester and the proportion of responses they received as a group.

	Spring 2022			Fall 2022			Spring 2023		
Ethnicity	Number of facilitators	# Responses	Responses per facilitator	Number of facilitators	# Responses	Responses per facilitator	Number of facilitators	# Responses	Responses per facilitator
Asian	12	73	**6**	14	111	**8**	12	120	**10**
Black	6	36	**6**	9	89	**10**	5	39	**8**
Hispanic	7	72	**10**	10	94	**9**	12	121	**10**
White	13	79	**6**	20	212	**11**	11	115	**10**

Response rate did not differ based on the ethnicity of the facilitators, however there was significantly greater response from female students than from male students enrolled in AEWs for students of all ethnicities except Hispanic (Table 4). Hispanic male and female students responded to survey questions in approximately equal proportion.

Table 4. Response rates by students of different ethnicities reported by gender (all 3 semesters combined). Data from the Workshop Survey.

Respondent ethnicity	# Total responses	#Female responses	# Male responses	df, X^2, p value
Asian	316	220	95	1, 123, $p< 0.01$
Black	182	106	76	1, 4.9, $p< 0.05$
Hispanic	292	154	138	1, 0.86, $p< 0.50 > 0.25$
White	371	248	123	1, 42, $p< 0.01$

To address the question about how students perceive that workshops influence their sense of belonging, inclusion, and confidence we analyzed data from two mid-semester surveys: the 'Workshop Survey' asks about the workshop environment without respect to facilitator identity, and the 'Facilitator Survey' asks questions related to practices used by individual facilitators that also include belonging and inclusion, as well as questions related to preparedness and pedagogical strategies to promote discussion and learning. This work is focused on four workshop survey questions (WSQ) that build community and support belonging and inclusion and three facilitator survey questions (FSQ) that focus on equity and mentorship.

> ***WSQ1*** *The workshops improve my confidence with the material.*
> ***WSQ2*** *I feel that I am a valued and respected member of my AEW.*
> ***WSQ3*** *The collaborative group work helps me learn the material better.*
> ***WSQ4*** *AEW sessions help me feel more connected to the college and university community.*
>
> ***FSQ1*** *The facilitator shows concerns for all.*
> ***FSQ2*** *The facilitator divides time equitably.*
> ***FSQ3*** *The facilitator provides mentorship.*

Respondents rated each of the WSQ and FSQ statements using a 5-point Likert scale rating the degree to which they disagreed or agreed with the statement: 1=Strongly Disagree, 2= Disagree, 3=Neither Disagree/Agree, 4=Agree, 5=Strongly Agree.

Data Analysis

Both workshop and facilitator survey data were collapsed into two score categories. Scores of 1,2,3 and 4 were combined into one category, and scores of 5 were a second category. Ratings of 1,2, and 3 were substantially fewer than scores of 4 and 5. As noted above, we observe that peers may be generous in their evaluations of each other and so to see differences at a finer scale we compared all other scores to the highest rating.

We used nominal logistic regression ('fit model' JMP Pro 16) to examine the effect of respondent gender, respondent ethnicity, and their interaction on student responses to 4 questions (Table 8, see Results section) related to belonging and inclusion in the 'Workshop Survey' (n= 908 total responses over three semesters).

To examine student responses to the practices used by their facilitators that build community, belonging and inclusion, we analyzed responses from 3 questions on the 'Facilitator Survey' (n=1161 total responses). We examined each question using a nominal logistic model (Table 9, see Results section) that included the effects of student ethnicity and gender, facilitator ethnicity and gender and the associated two-way interactions (student ethnicity*student gender, student ethnicity*facilitator ethnicity, student gender*facilitator gender)

Results

RQ1 *What is the relative representation of student demographic groups in peer-led workshops?*

We first examined our AEW enrollment compared to college admissions data, to understand the demographics of students we were reaching within the College of Engineering. The data shown below in Table 5 demonstrates that 40% or more of all first-year engineering undergraduates enrolled in at least one AEW each of the last two academic years. Moreover, around 50% of first-year female engineering students enrolled in at least one workshop and nearly 60% of Underrepresented Minority (URM) students enrolled in at least one AEW during their freshmen year during this period.

Table 5. Engineering student enrollment in workshops compared to their overall representation in the College of Engineering.

Type of Enrollment by Academic Year (AY)	**AY 2021-2022**	**AY 2022-2023**
Number of Students Enrolled in Workshops	893	955
Number of Engineering Students Enrolled in Workshops	747	730
Number of Unique Engineering Students Enrolled	484	457
Number of Engineering Freshmen	902	823
% of Engineering Freshmen Enrolled in at least 1 Workshop	***45%***	***40%***

Number of Engineering Sophomores	743	871
% Engineering Sophomores Enrolled in at least 1 Workshop	10%	14%
Number of Women Enrolled in Workshops	541	554
Number of Unique Women Students Enrolled	286	275
% Women of all AEW enrollees	61%	60%
Number of Women Engineering Freshmen	447	404
% of Engineering Freshmen that are Women	50%	49%
% of Women Engineering Freshmen Enrolled in at least 1 Workshop	***53%***	***48%***
Number of Women Engineering Sophomores	354	416
% of Women Engineering Sophomores Enrolled in at least 1 Workshop	13%	19%
Number of URM Enrolled in Workshops	314	354
Number of Unique URM Students Enrolled	176	168
% URM of all AEW enrollees	35%	37%
Number of URM Engineering Freshmen	233	187
% of URM Engineering Freshmen Enrolled in at least 1 Workshop	***57%***	***58%***
Number of URM Engineering Sophomores	170	214
% of URM Engineering Sophomores Enrolled in at least 1 Workshop	23%	26%

The data pulled from workshop enrollment and enrollment in the corresponding lecture courses more directly illustrates the higher representation of female students (Table 6), as well as Black and Hispanic students (Table 7) in the workshops compared to the lecture enrollment.

Table 6. Gender of students enrolled in the lecture courses and workshop courses during three semesters analyzed. Data from the University Enrollment Database.

Gender	Lecture course enrollment	Workshop course enrollment	% of total lecture enrollment	% of workshop enrollment
Female	5624	781	45%	59%
Male	6888	549	55%	41%

Table 7. Ethnicity of students enrolled in the lecture courses and workshop courses during three semesters analyzed. Data from the University Enrollment Database.

Ethnicity	Lecture course enrollment	Workshop course enrollment	% of total lecture enrollment	% of workshop enrollment
Asian	3828	288	31%	22%
Black	913	196	7%	15%
Hispanic	1643	258	13%	19%
White	3169	326	25%	25%

RQ2 *Is perception of belonging and mentorship in workshops similar for students among different demographic groups?*

With students grouped by those who responded with a score of 1,2,3, or 4 *versus* the highest score, 5, the only significant gender effect was in response to workshops increasing confidence (Table 8). Regardless of ethnicity, male students were more likely to report that the workshops increased confidence with the course material at the highest level (Odds Ratio = 1.81). Thirty-seven percent of female respondents reported ratings of 5 for the question of improving confidence as compared to 40.2 % for male respondents. Female respondents also rated in the lowest categories (1, 2 or 3) 13.7% versus males at 8.2%.

Table 8. Nominal Logistic regression outcomes (odds ratios for student responses to 4 questions associated with belonging and community in AEW workshops (Spring 2022, Fall 2022, and Spring 2023, n= 908 responses from students of Asian Black Hispanic, and White ethnicities)

Question posed to respondent	Source	Comparison	Odds Ratio (of a score of 5 versus 1,2,3, or 4)	Confidence interval (lower 95% - Upper 95%)	P-value
The workshop improves my confidence	Respondent Gender	Male vs Female	1.81	1.14 - 2.86	**0.011**
	Respondent Ethnicity	White vs Black	1.85	0.975 - 3.51	0.060
I feel that I am a valued and respected member of my workshop	*No significant effects*				
The workshop makes me feel connected to the Cornell community	*No significant effects*				
The collaborative groupwork helps me learn the material better	Respondent Gender	Male vs Female	1.58	1.06 - 2.34	0.023

** Bonfrerroni adjusted alpha due to testing 4 questions with the data set = 0.05/4 = 0.017. Uncorrected p-values that meet the adjusted criteria for significance are in bold

It is noteworthy that across all student ethnicities analyzed, 84% or more students reported agreeing or strongly agreeing (score of 4 or 5) with this statement that the workshop improved confidence the material. Thus, the significantly lower ratings of '5' by female students does not suggest females do not experience confidence gains in the workshops.

Similar to the value of the workshops for building confidence, males had a higher likelihood of reporting a score of '5' for the statement that collaborative groupwork helped them learn the material better. Although female students were less likely to rate the value of groupwork at the highest level compared to males, 82% of female respondents did choose this rating. This is compared to male respondents at 87%. There were no significant differences related to student ethnicity. The range of students who reported '5's across all student ethnicities was 82% - 85% for the value of groupwork.

There were no statistically significant differences based on student gender or ethnicity in the feeling of being respected and valued in the AEW courses (**WSQ2**). Again, 90% or more of students of all ethnicities agreed or strongly agreed that they felt valued and respected in their workshop course. Additionally, students from all ethnic backgrounds reported a range of 70 – 76% agree or strongly agree that the workshops helped to connect them with the College of

Engineering and the University community (**WSQ4**), with no differences among ethnicity or gender.

Hispanic and White students, regardless of gender, were more likely to award the highest score (5) to facilitators for 'showing concern for all students' (**FSQ1**) than were Black and Asian students. We note here that the range of scores for 'agree (4) + strongly agree (5)' was between 91% and 98%.

Similar to 'showing concern for all', students who were Hispanic and White were more likely to rate the workshop as a '5' than were Black and Asian students when asked if facilitators 'divide time equitably between groups' (**FSQ2**). The exception to this was that White and Black students were more likely to 'agree or strongly agree' (100% and 97% respectively) that Hispanic facilitators divided time equitably between groups, than were Hispanic or Asian students (95% and 93% 'agree or strongly agree respectively'). For FSQ1 and FSQ2, Asian students were less likely to strongly agree with either statement.

Receiving a score of 5 (versus 1,2,3 or 4) on the question 'facilitators provide mentorship' (**FSQ3**) in the workshop was affected by both respondent and facilitator ethnicity independently. Hispanic students were 1.5 times more likely to report a score of '5' with respect to being mentored than were Asian students. Additionally, Hispanic facilitators were 1.5 times more likely than Asian or White facilitators to receive a score of '5' for providing mentorship (Table 9). The data suggests a trend that Black facilitators were more likely to receive a 5 for providing mentorship than were White (Odds Ratio 1.39, p= 0.01) or Asian facilitators (Odds Ratio 1.45, p=0.08).

Table 9. Nominal Logistic regression outcomes (Odds ratios, confidence intervals, prob> chi2) for peer facilitator behaviors that are associated with belonging and community in AEW courses (Spring 2022, Fall 2022, and Spring 2023, n= 1160 t responses from students of Asian Black Hispanic, and White ethnicities). For each question only variables that are or are near statistically significant are included.

Survey Statement regarding Facilitator Actions	Source	Comparison	Odds Ratio (of a score of 5 versus 1,2,3, or 4)	Confidence interval (lower 95% - Upper 95%)	P-value**
Facilitator shows concern for all	Respondent Ethnicity	Hispanic vs. Asian	1.90	1.30 - 2.79	**<0.001**
		White vs. Asian	1.75	1.23 - 2.47	**0.002**
		Hispanic vs. Black	1.60	1.04 - 2.48	0.034
Facilitator divides time equitably	Respondent Ethnicity	Hispanic vs. Asian	2.30	1.58 - 3.34	**<0.0001**
		White vs. Asian	2.07	1.47 - 2.92	**<0.0001**
		Hispanic vs. Black	1.97	1.34 - 3.38	**0.002**
		White vs. Black	1.77	1.19 - 2.64	**0.005**
	Facilitator Ethnicity	Hispanic vs White	1.61	1.12 - 2.31	**0.011**
Facilitator provided mentorship	Respondent Ethnicity	Hispanic vs. Asian	1.54	1.09 - 2.17	0.019
	Facilitator Ethnicity	Hispanic vs. Asian	1.56	1.10 - 2.20	**0.012**
		Hispanic vs. White	1.49	1.08 - 2.07	**0.017**

** Bonfrerroni adjusted alpha due to testing 3 questions with the data set = 0.05/3 = 0.017. Uncorrected p-values that meet the adjusted criteria for significance are in bold

RQ3 *Does the intersection of workshop facilitators' identities and identity of students in the workshops impact the perception of belonging and mentorship in workshops?*

Finally, we examined the intersection of facilitator and student participants' ethnicities and genders (as is common in student evaluations of teaching) and the potential impact on student ratings for these questions. Specifically, we wondered if there might be a positive relationship between outcomes in workshops where the facilitators and the students shared an ethnicity. Our data suggest that while there may be some trends in this direction there are no obvious or statistically significant interactions, nor are there interactions between facilitator gender and student gender with respect to belonging and mentoring in the workshop.

Discussion

While the enrollment numbers showing that AEWs serve a higher relative proportion of female and Black and Hispanic students were not surprising, confirming these trends provides a strong rationale for examining the next two research questions about student experience in these workshops as it relates to ethnicity and gender of students and the facilitators. With female and URM students, including Hispanic and Black students, being overrepresented in the AEWs relative to their general enrollment, the AEWs are a clear opportunity to impact the experience of these students on their STEM pathway.

Women are less likely to pursue engineering and computing professions due to a lack of confidence in ability to do well in these fields [11] and even when women do attain these positions research has shown that a gap in confidence between men and women aligns with a gap in pay [12]. Thus, the value of the workshops for helping build confidence in all underrepresented student populations is important. While 86% percent of females in AEW rated their workshops a '5' for confidence building, males in the workshops did so at 92%. While we are excited that women find value in the workshops for increasing their confidence, this closer look at the highest ratings suggests the work is not done and will allow us to consider the experience of female students more closely in our facilitator trainings and messaging. Currently we include a focus on "growth mindset" in our training for facilitators, and there may be an opportunity to examine ways in which we can ensure this mindset is being discussed and reinforced in each of the AEW sessions.

Furthermore, given the potential for stereotype threats and bias in the classroom, it was encouraging to see that women rated the opportunity to collaborate and share ideas as highly as they did, though still not as high as males. This could be connected to the increased confidence with the material over the course of the semester (though again not rated as highly as males) or possibly the composition of the facilitators and the workshop itself helping to create a comfortable learning environment. Female facilitators outnumber male facilitators in our workshops and female students are also in higher proportion. These demographics might allow us to include more interventions that focus on developing confidence in female students.

With all ethnic groups providing similarly high ratings for the value of group work, the higher relative enrollment of Hispanic and Black students is important. Since the creation of workshop models akin to the Treisman model, the importance of studying together in groups continues to be highlighted as a key component to retaining marginalized students in engineering [13], [14].

Additionally, the fact that all students regardless of ethnicity or gender felt valued/respected in their workshop was a critical outcome. Over 90% of respondents agreed or strongly agreed with the statement, making it clear that facilitators are creating a welcoming and inclusive environment for all students in the classroom which reinforces the training practices that have been in place over these three semesters [10], [15]. Our evidence-supported understanding that belonging is primary to allowing effective learning opportunities makes this outcome one of the most important findings.

Not only were students feeling respected, but we generally were also excited that mentoring appears to happen well in all workshops regardless of ethnicity or gender of either set of peers. That said, it was notable that Hispanic students were much more likely to strongly agree that their facilitators provided mentorship, and Hispanic facilitators were more likely to be rated the highest for providing mentorship. This brings up questions about what mentorship means and looks like for students and if there are lessons to be learned that can be incorporated into broader training for all facilitators.

However, we note that Asian students were not as likely to give the highest rating to these survey questions related to the facilitators use of time, facilitators providing mentoring, and facilitators showing concern. As with the other differences in our study, the data suggests that there is a level of satisfaction from Asian students, however it is not as great as White and Hispanic students seem to experience. Given the documented stereotype of Asian students as the "model minority" [16], this is potentially concerning and does highlight a focus area for deeper exploration and improvement—are there biases at play limiting the support facilitators are giving Asian students? Currently trainings do discuss the need for facilitators to make sure they are checking in with all students and dividing time equitably. However, additional emphasis and structure to help track this practice and have facilitators reflect on potential biases toward which students they perceive need more or less support may be worth exploring so that all students feel they are receiving the attention and assistance they need.

We are also interested in the workshops' ability to help students feel more connected to the community at large. Recent Cornell University survey data highlights that many populations, including Black and Hispanic students, do not feel as connected to the University community compared to their White and Asian counterparts [17]. In a recent student experience survey, 23% of Black respondents disagreed or strongly disagreed with the statement, "I feel like part of the community at Cornell." Nearly 20% of Hispanic students also disagreed with that statement. The responses to the related question in our workshop survey is one of the lowest rated of all the questions, however it is encouraging to see that over 70% of respondents did feel the workshop positively impacted their feeling of connection to the larger University community. This question

is the most removed from the direct impact workshops can make, but it encourages us to continue to think about how we can impact the student experience even beyond the workshops.

Finally, we were interested in the intersection of facilitator ethnicity and student ethnicity particularly with respect to underrepresented student groups in AEW workshops. A possible outcome we considered was that Black or Hispanic students, particularly, might feel more of a sense of belonging in workshops where peer facilitators shared their ethnicity. While there were some trends in this direction, it appears that facilitator ethnicity and student ethnicity have very little interaction with respect to our diverse group of students feeling like they belong in, are respected in, and are mentored in AEW courses. Overall student responses to survey questions suggest that we have come a long way toward creating the inclusive communities which are the most critical aim of these supportive learning communities.

Further research in this area will include review of narrative survey data that may provide additional context to the Likert-scale ratings and focus group interviews to talk about student experiences in the workshops, including interviews with students who complete the workshops, students who drop workshops during the semester, and students who never enroll in workshops. Gaining a better understanding of what make students stay, what makes them leave, or what makes them never enroll will add richer qualitative data to this research and help us identify the mechanisms at play for different students.

Acknowledgements

The authors would like to thank the support of John A. Swanson '61, BME '62, MS ME '63 for his sponsorship of the Academic Excellence Workshops. We would also like to acknowledge the tremendous support from the College of Engineering and the Bowers College of Computer and Information Science. The first author would also like to thank the Engineering PLUS stEm PEER Academy for their support and guidance.

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