The Biomedical Engineering Education Community (BEEC) Share and Learn Virtual Community of Practice

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A New Community-Led Virtual Share and Learn by the Biomedical Engineering Education Community (BEEC)

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Abstract:

With the advancement of online technologies, there has been a rapid increase in the sharing of information globally, which has led to virtual communities of practice for various types of professions. Communities of practice are typically groups of people who enrich their expertise through interactions with similar people in their field. The Biomedical Engineering Education Community (BEEC) is a virtual community of practice for biomedical engineering (BME) and bioengineering (BIOE) educators interested in improving educational practices. BEEC utilizes online platforms such as Slack and Zoom to allow educators to discuss teaching tips, upcoming funding opportunities, job opportunities, and webinars. In addition, BEEC hosts a monthly virtual collaboration event called “Share and Learn”, virtual “brown bag lunch” events hosted via Zoom to allow for educators to share ideas with their colleagues and possibly form new collaborations. These events have impacted the BME community by providing a collaborative space for educators to share resources and build collaborations across the nation.

The aim of this paper is to analyze the participation across all these events to understand the roles and types of faculty that attend, which universities they come from, and the perceived utility of the event content for attendees. The program had 14 presenters and 90 unique participants from 55 different institutions. Analysis of event discussions highlighted the need for BME educators to openly collaborate to be able to share resources and create collective knowledge, as well as perform networking and interprofessional collaboration. The results of this study suggest that these kinds of events are impactful on different faculty ranks and universities, and can create a no-cost method of change in how evidence-based pedagogies and teaching strategies are shared among educators.

Introduction:

There has been a rapid increase in the sharing of information with the advancement of online technologies globally, which has led to various virtual communities of practice for different types of professions. In the education and teaching community, these virtual communities have been utilized among individuals to improve interprofessional education and interinstitutional collaboration, and most communities that have been developed in the past have been traditionally

for those in medical education [1 - 3]. By definition, virtual communities of practice are groups of people who enrich their expertise through interactions with similar people in their field [4 - 6]. In addition, these communities of practice typically support the concept that community knowledge is greater than individual knowledge as well as constructivism, or collaborative learning [5].

Virtual communities of practice have enabled participants to share their ideas with professionals of different levels of expertise, backgrounds, and locations. They have the unique ability to engage professionals at all levels at a global scale to enable knowledge management and information sharing, as well as continuing professional education [1]. For instance, in the healthcare community [1], virtual communities of practice have allowed health and social care professionals to collaborate and share health information globally to create better definitions and approaches for diagnoses and treatment, and share this information with all levels of the healthcare workforce to improve the quality of patient care. This has been achieved by allowing professionals to target their focus on sharing and promoting evidence-based practices, which has resulted in members drawing on expertise from research, experience, patients, and their local context. Through this sense of community and diverse cultural knowledge transfer, virtual communities of practice have also been able to reduce professional isolations and aid in the retention of healthcare professionals, especially in rural areas where educational opportunities and support can be limited [1]. The positive impact that these communities have had on global knowledge sharing and breaking down professional silos and isolation in healthcare communities has led to the use of virtual communities of practice among other professions, such as in education and scientific research.

Similar to healthcare professionals, education professionals have also experienced barriers associated with professional silos and isolation. In particular, faculty at research-intensive universities can hold alternative titles and roles within the institution, which can lead to different perceptions among their faculty peers and students [7]. For instance, faculty on the tenure track with a higher research and lower teaching focused role will have the title “Professor”, whereas those who have a more teaching focused role can be given the title “Teaching Professor”. This is even more challenging where faculty at different institutions who hold the same or similar teaching-focused role can have vastly different titles such as “Instructor” or “Lecturer”. Prior research [7] has found that these alternative titles for faculty can influence how their faculty peers perceive them, creating professional barriers that can impede knowledge sharing and create isolation. In particular, a prior study has shown that tenure track or tenured faculty who have a reduced teaching-focused role or title believe that those with a teaching professor title are paid less, less likely to have tenure, hold a PhD, or are respected outside of their university, and those with “Lecturer” and “Instructor” titles are even lower in status [7]. In an effort to begin to provide a space where teaching and research faculty can collaborate positively, it is important for education professionals in academic institutions such as research-intensive institutions to participate in virtual communities of practice where professional development tools and collaboration across different faculty roles can be supported through knowledge sharing of educational practices.

Education professionals across different institution types and roles have found that virtual communities of practice have been able to improve education across different STEM disciplines at the national and international levels [8-12]. In particular, participation in these communities can improve instruction and active learning techniques [8, 9], provide mentoring to support instructors [10], facilitate pedagogical identity development [11], and foster collaborations for external funding mechanisms [12]. To best enable participation and facilitation of professional development, professional organizations have found that virtual communities of practice require organizational support for the technical infrastructure that the participants utilize to facilitate interactions [13]. Prior research on the use of these virtual communities of practice [13 - 15] has found that organizers must facilitate the virtual environment by providing management support and asynchronous interactions to facilitate the use of the virtual community, as well as activities that promote professional development. These facilitating support services have been found to enable more effective virtual community of practice in which participants perceive the community as useful and easy to use. Furthermore, to enable these services and activities among virtual communities of practices seamlessly [16], many organizers have utilized team-based online platforms such as Slack [17] or Microsoft Teams [18] for asynchronous collaboration and user management, and video conferencing such as Zoom [19] and Skype [20] for synchronous face-to-face activities.

The aim of this study is to introduce a virtual community of practice specifically designed for biomedical engineering (BME) education that has been developed using an online team-based platform, an active website, and synchronous virtual professional development activities that can enable best practices for virtual communities of practices as described above. In particular, the following research questions were posed: 1) who participates in virtual collaboration events aimed at facilitating collaborative learning of various BME education and professional development topics?, and 2) what are the demographics of the participants of these events in terms of title, role, and institution? Results of this study aim to elucidate whether a BME virtual community of practice can break down the aforementioned professional silos through online asynchronous and synchronous knowledge transfer.

Methods:

The Biomedical Engineering Education Community (BEEC) [21] is a virtual community of practice for biomedical engineering (BME) and bioengineering (BIOE) educators interested in improving educational practices. BEEC utilizes online platforms such as Slack (Slack Technologies LLC., San Francisco CA) and Zoom (Zoom Video Communications Inc., San Jose, CA) to allow educators to communicate through both text and video mediums. To advertise the BEEC virtual community to educators, announcements have been made at the American Society of Engineering Education (ASEE) Annual Conference during Biomedical Engineering Division (BED) events and meetings, through the ASEE BED's monthly newsletter and website, and directly through the BEEC community email list to encourage members to recruit others who may be interested in joining. The community provides educators with a Slack channel to discuss teaching tips, upcoming funding opportunities, job opportunities, and webinars. The website and Slack channel also provide compiled resources from the BME education community, such as

textbooks, websites, platforms for publications and conferences, funding opportunities, and journal articles. In addition, BEEC hosts an annual conference for educators to learn about current topics in BME education and present their ideas and current work in the field. In 2021, BEEC introduced a monthly virtual collaboration event called "Share and Learn", events that are hosted via Zoom to allow educators share ideas with their colleagues and possibly form new collaborations [22]. This hour-long synchronous event is hosted each month by a different educator who has expertise on a topic of interest to the community, and provides the participants with a short presentation or talk followed by an open discussion and sharing of resources. Topics are determined through a brief online survey that is sent out monthly to the BEEC Slack channel, as well as through discussions with BME education research experts if there are any timely topics given upcoming events, news, or opportunities. Speakers who are known experts in the chosen topic are then invited to give an upcoming Share and Learn each month by the BEEC Share and Learn coordinator. All upcoming and prior events that have been offered are posted on the BEEC website [22], and include documentation of the resources shared and discussions, video recordings, and slide decks for each event for others to be able to utilize if they were unable to attend.

To assess research question 1, "who participates in virtual collaboration events aimed at facilitating collaborative learning of various BME education and professional development topics?", the registrants' list for all of the events since Jan 2022 were analyzed. Participants' academic rank as well as their institution names were found online (note that the affiliations found represent participants' current positions and do not reflect their status at the time of the events and are dependent on what was available on their respective institution's websites or personal webpages). The ranks were then classified into three main categories: research-focused positions, teaching-focused positions, and other types of positions in academia (e.g., PhD students, postdoctoral scholars). For both teaching- and research-focused positions, assistant-, associate- and full professorship ranks were considered. Ranks including professor of practice, teaching professor as well as clinical professors were all lumped into the teaching-focused positions at different ranks. Due to the lack of uniform definition of the lecturer roles, for the sake of this analysis, principal lecturers and lecturer I positions are considered at an equivalent rank of assistant professor level, while senior lecturers and lecturer III positions were equivalent of professor level. Other ranks, such as PhD students, post-doctoral fellows, and lab managers, are all classified as "others".

We also examined participants' institutions and their Carnegie research level category (i.e. R1, R2, R3) to assess what types of institutions encourage this type of professional development, and whether institution type could serve as an indicator of which participants engage in these events. In addition, we also analyzed leadership roles (e.g. chair, program directors, department chairs) in our assessment of the participants.

We have done a similar analysis on the affiliations of the presenters and assessed what levels and ranks are most engaged in sharing their activities and pedagogies with others. Participants live engagement level was assessed through their log-in time for each event (collected by Zoom and with respect to the total duration of each event). Finally, we looked into the number of unique

visits to the Share and Learn webpage [22] to assess offline engagement of the community with these events.

We also surveyed the participants on their perception of the Share and Learn event's value to their career, professional development, and teaching enhancement via an online survey after all of the events had occurred. Survey questions included the following questions listed in Table 1. These questions were used to assess research question 2, "what are the demographics of the participants of these events in terms of title, role, and institution?" In particular, a quantitative analysis of questions Q1, Q2, Q3, and Q4 was performed to determine the percentage of each demographic as well as number of participants in similar roles in terms of research-focused or teaching-focused positions as well as level (i.e. lecturer, assistant professor, associate professor, full professor, or an "other" position). Q5 was utilize to assess which event had the highest and lowest participation, while Q6 through Q10 were analyzed quantitatively and qualitatively using a mixed-methods approach using a convergent parallel design to determine potential future improvements for the events.

Table1. Survey questions for the online post-attendance survey of the Share and Learns.	
Q1	What is your title/rank? (e.g. Assistant Professor)
Q2	How would you describe gender identity? • Man • Woman • Non-Binary/Third Gender • Transgender • Gender Variant/Non-Conforming • Prefer Not to Say
Q3	How would you describe yourself? (Select all that apply) • American Indian or Alaska Native • Asian • Black • African-American • Hispanic or Latina/o • Middle Eastern or North African • Native Hawaiian or Other Pacific Islander • White • Prefer Not to Say
Q4	How many years have you been teaching?
Q5	Which of the following Share and Learns did you attend? 1. September 2021: Finding Collaborators for Large Scale Student Perceptions of BME Research led by Nicole Ramo 2. October 2021: Building the Best BME Intro Course led by Alexis Ortiz-Rosario

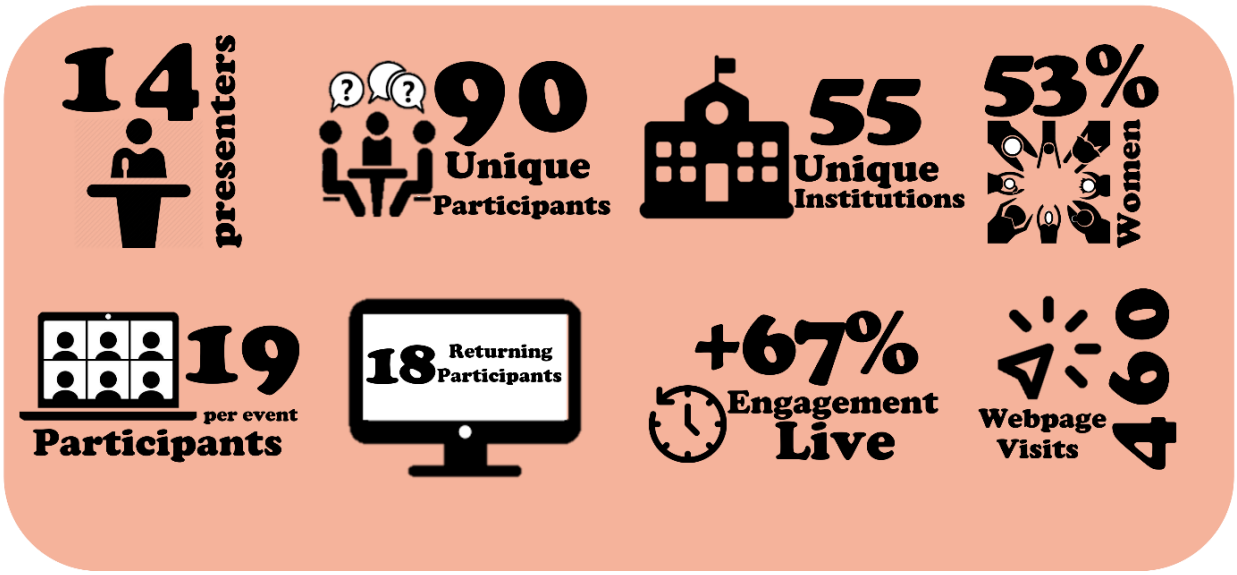
	3. November 2021: Entering Research Program: Aligning Advisor-Advisee Expectations to Form Effective Mentoring Relationships led by Yanfen Li and Hsien-Yuan Hsu 4. December 2021: BEEC Holiday Party led by Christine King and Yanfen Li 5. February 2022: Developing Projects for Senior Design Courses led by Christine King 6. March 2022: Teaching Thermodynamics to Biomedical Engineers led by Adam St. Jean 7. April 2022: Teaching Design Control for Medical Devices led by Verna Rodriguez 8. May 2022: Teaching Biotransport to BME Students led by Zhongping Huang 9. September 2022: The Best Textbooks for the BME Curriculum led by Alexis Ortiz-Rosario 10. October 2022: Learning from the BME Podcast led by Allison Mitzak and Brian Kim 11. November 2022: Thrive! Allowing Students to Thrive at Your Institution led by Joseph Tranquillo 12. January 2023: Funding Opportunities in Engineering Education led by Jenny Amos
Q6-Likert	How has attending the Share and Learns added value to your overall career?
Q7-Likert	How has attending the Share and Learns added value to your teaching?
Q8-Likert	How has attending the Share and Learns added value to your professional development?
Q9	Which Share and Learn topics did you find most informative?
Q10	Would you suggest any improvements to the format, topics, or other aspects of the Share and Learn program?

Results:

The monthly BEEC Share and Learns have covered various topics and have been led by the broader BME community. Examples of the topics covered include: 1) finding collaborators for large-scale BME research, 2) creating the best BME introduction course, 3) forming effective professional mentoring relationships, and 4) textbook recommendations for various courses. It can be noted that the topics selected span beyond teaching strategies, as BME educators often find themselves involved in greater roles than simply teaching. These Share and Learn events have impacted the BME community by providing a collaborative space for educators to share resources and build collaborations across the nation. In particular, deliverables from the events include a list of BME textbooks for different topics across the curriculum, websites, and application interfaces for mentorship, university resources for undergraduate students, and online resources for teaching design controls, biotransport, thermodynamics, and senior design courses.

Quantitative analysis of the participants in BEEC Share and Learn events throughout the last year, shows that there were 90 unique participants across the world (Figure 1a). There were on average 19 participants in each of the Share and Learn events in 2022. More than 53% of the participants were women, which shows that there was a high level of gender diversity at the events. Out of the 90 participants, 18 participants attended at least 2 Share and Learn events throughout 2022, which speaks to the value perceived by the community. The most engaged member of the community was a PhD student in the field of Engineering Education who participated in 7 out of a total of 8 events in 2022. Participants in each event attended on average 67% of the event, with the maximum time spent interacting with the presenters at around 86% by educators from a diverse rank level (from student to post-doctoral fellow and professor). Moreover, the engagement with the content continued beyond the duration of the synchronous event, as indicated by the number of times the Share and Learn webpage [22] was visited and how these number of visits grew over time.

a)



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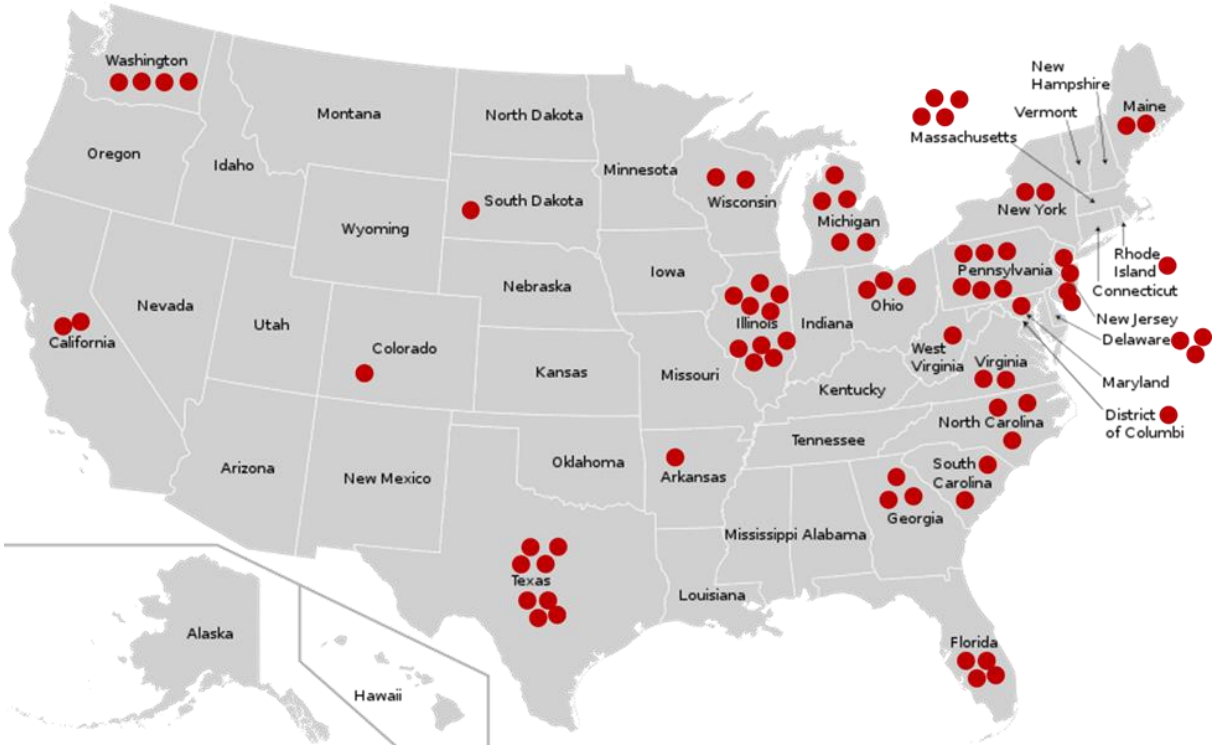

Figure 1: Why we do what we do: a) quantitative results from the Share and Learn analysis and the impact form the educator community to the educator community, b) map depicting the location of the participants who attended the Share and Learn events who resided in the US.

The participants were from 55 unique institutes, with most participation from the universities of Michigan and Delaware (Figure 1b and Table 2). The majority of the participants (76%) and presenters (42%) of the events were from R1 institutions, the highest level of research activity institution type, while a smaller percentage were from R2 (10% and 33% respectively) and non from R3 institutes, moderate level of research activity institution type (Table 3). The remaining values, in both presenter and participant groups, are from uncategorized institutions not listed in the Carnegie Classifications of Institutions of Higher Education (15% and 25% respectively).

Table 2. Participant universities and institutions of the universities that had the most participants attend the BEEC Share and Learns.

Michigan	5	Binghamton	1	North-Carolina	1
Delaware	4	Biola	1	Pennsylvania	1
Illinois-Urbana-Champaign	4	Stevens-Institute-of-Technology	1	Rensselaer-Polytechnic-Institute	1
Florida	3	Bucknell	1	Rowan	1
Illinois-Chicago	3	Carnegie-Mellon	1	Santa Clara	1

Northwestern	3	Cincinnati	1	South-Dakota	1
Rice	3	College-London	1	British-Columbia	1
Washington	3	Colorado-State	1	Stevenson	1
Brown	2	George-Washington	1	Temple	1
Clemson	2	Miami	1	Texas-A&M	1
Duke	2	Georgia-Tech	1	Texas-Austin	1
Lehigh	2	Harding	1	Texas-Dallas	1
Maine	2	Harvard	1	Texas-San Antonio	1
Milwaukee	2	Howard	1	Uniandes	1
Ohio-State	2	Kennesaw-State	1	UT-Southwestern	1
Rutgers	2	Georgia-Institute-of-Technology	1	Virginia-Commonwealth	1
UMass-Lowell	2	MIT	1	Virginia-Tech	1
Washington-St. Louis	1	West-Chester	1	West-Virginia	1

Table 3. Types of Institutions by participant and presenter.

	Participants	Presenters
R1	64	5
R2	9	4
R3	0	0
Unknown	9	3

When looking at the diversity of the participants, it was found that more than 30% of the engagement was from participants who have a research-focused tenure-track position, while 28% of the engagement was from participants who hold teaching-focused positions within their institution (Figure 2a). Across all tracks (both tenured and non-tenured positions), the majority of the participants were at the assistant professor level, as they were likely utilizing the events to improve their professional development and career promotions. However, we saw a significant number of associate and full professors participating in the events, which highlights the value brought to the community by the other community educators. The tenure-track participants made up 70% of the participants who attended the events, which may be due to the fact that these positions also encourage professional development for higher levels of career promotion. At any particular level, on average 6% of the participants were in some sort of leadership and

administrative roles within their institution, which is also indicates how these events were perceived as valuable to the BME educator community beyond professional development of tenured and non-tenured track professors (Figure 2b).

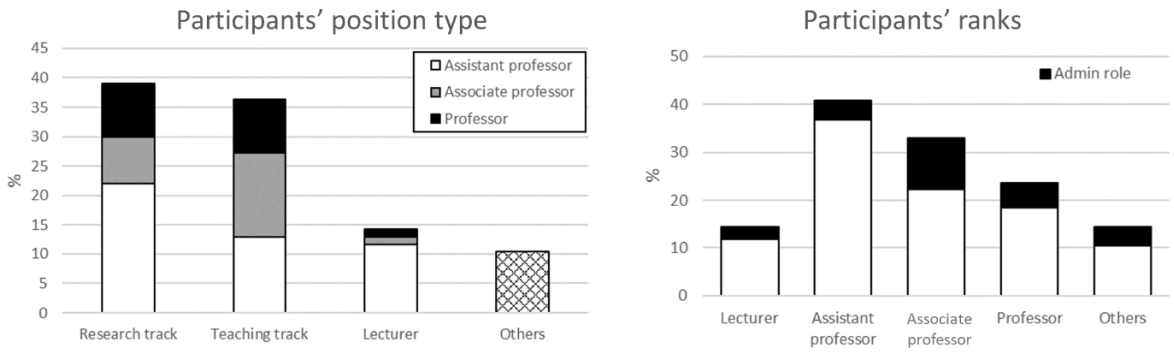

Figure 2. a) Participant ranks and b) position types (N = 77).

In addition to institute type and participant professional role, we also analyzed the professional roles of the presenters for the events. As shown in Figure 3a, educators from both research- and teaching- focused roles were equally committed to sharing their knowledge with the community. Among the presenters, the majority of engagement was at the assistant professor level, which could also be due to the required professional development needed for career advancement and promotion. Furthermore, we observed that approximately 30% of the presenters held a leadership position at their institution (Figure 3b).

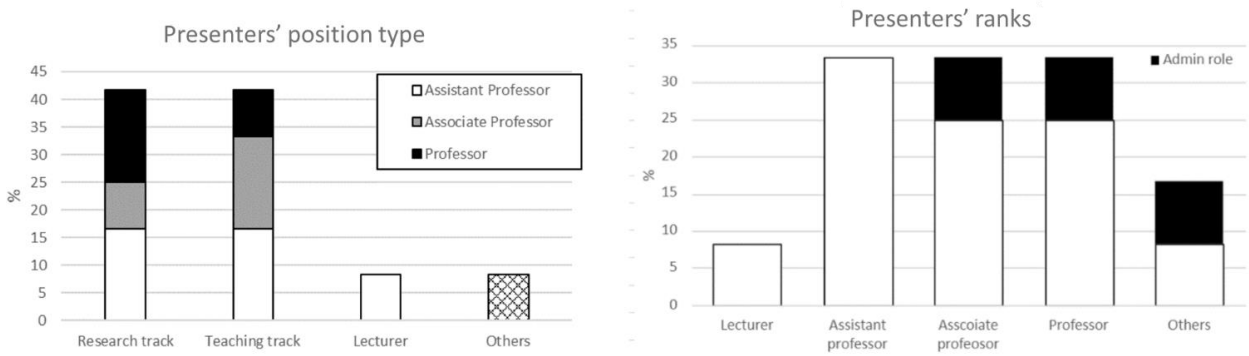

Figure 3. a) Presenter ranks and b) position types (N = 12).

We examined the number of times BEEC members engaged with the Share and Learn content on the website [22]. The event slides as well as a brief summary of each session were posted after a Share and Learn event was held on the BEEC Share and Learn page, so those who did not get a chance to participate in the live session could access the content. After looking at the number of times the Share and Learn webpage [22] was visited each month (Figure 4), offline engagement with the content was shown to increase 5-6 times since the beginning of 2022, which further indicates the community acknowledging the value of these events and utilizing the knowledge gained from the events asynchronously.

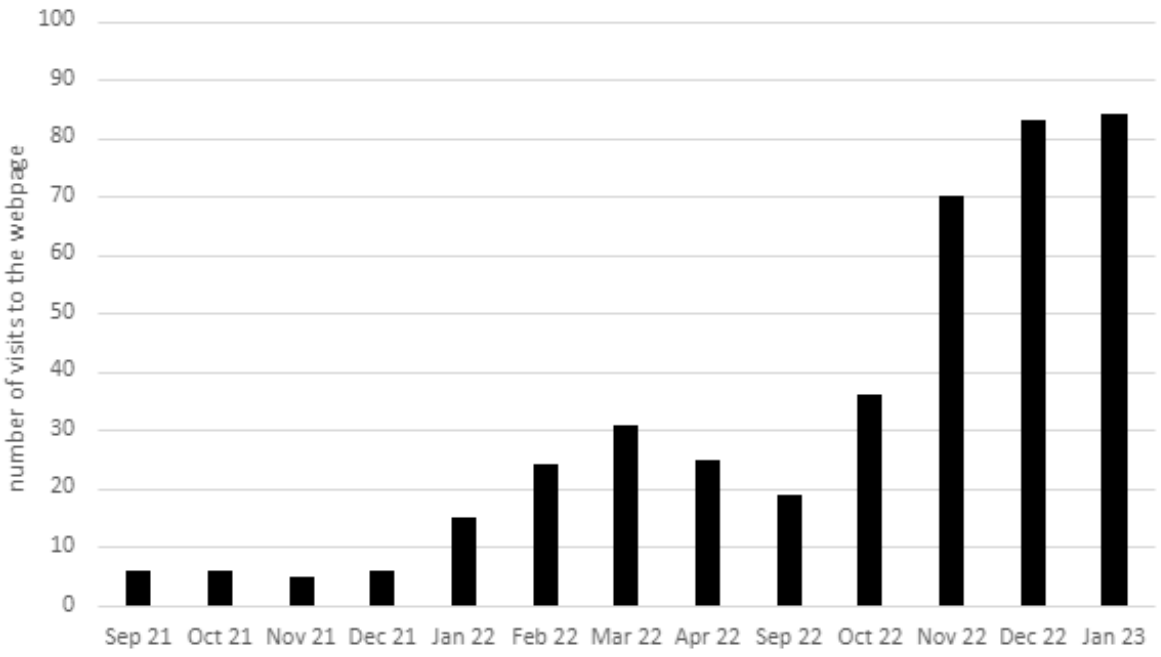

Figure 4. BEEC Share and Learn engagement as indicated by the number of visits to the Share and Learn webpage [22].

To understand the impact of the perceived knowledge transfer utility among the participants, the feedback survey was analyzed to determine whether participants found that the program impacted their teaching, career, and professional development. Only 21% of the total participants from the events (N=19/90) responded to the feedback survey that assess the overall Share and Learn event program. Among these respondents, 55% were female and 66% were white. Participants of the survey had different levels of teaching experience, ranging from less than a year to 25 years of teaching, with most respondents (63%, N=12/19) being in their early career stages (less than ten years of teaching experience). Among the respondents, the Share and Learns events that focused on funding opportunities and finding BME textbooks were the most popular (having 47% and 42% attendance, respectively). Sixty-three percent of the respondents indicated that the Share and Learn events had overall added value to their career, while 47% acknowledged that the Share and Learn events added value in their teaching and professional development (Figure 5).

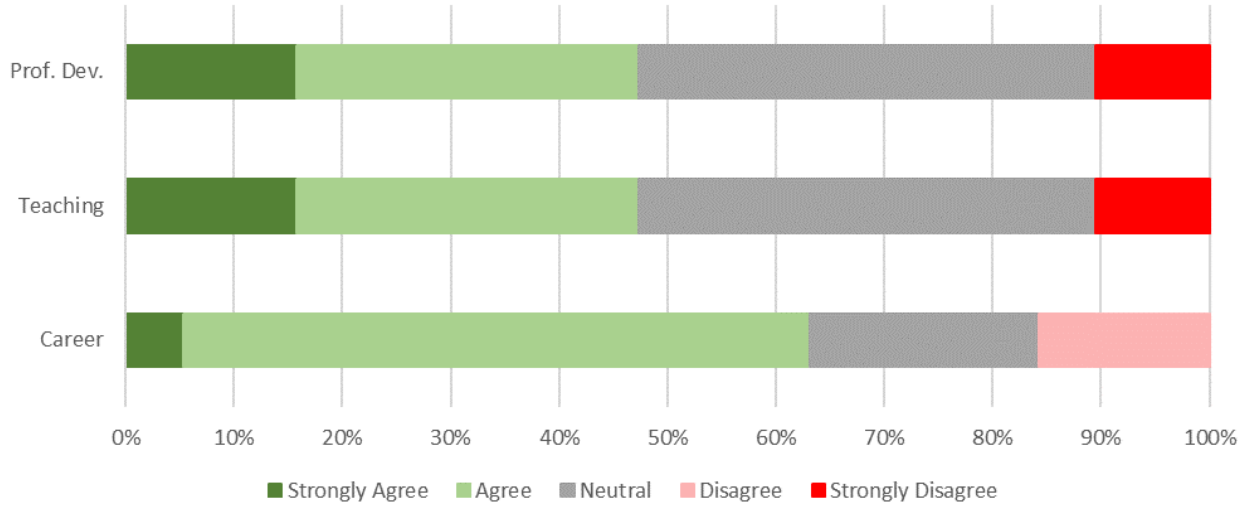

Figure 5. Impact of the Share and Learn events on the participants' career, teaching and professional development as perceived by the event participants who took the online survey.

Lastly, qualitative analysis included a mixed methods approach in which Likert questions and open-ended questions were examined using a mixed-methods approach in which the quantitative and qualitative questions were collected at the same time using the survey described in the methods section. The quantitative results from Q6 through Q8 in Table 1 (as seen in Figure 7) showed that the Share and Learn events had overall added value to their career (63%) and their teaching and professional development (47%). After qualitatively analyzing Q9, it was determined that the most informative Share and Learn topics were the "The Best Textbooks for the BME Curriculum", as well as topics that were specific to a course-aligned topic, such as "Teaching Thermodynamics to Biomedical Engineers" or "Developing Projects for Senior Design Courses". Furthermore, after qualitatively analyzing suggested improvements (Q10, Table 1) and observing that the quantitative results showed majority of participants found the Share and Learn events added value to their career, participants commented that:

> *"The programs that I have attended have all been useful. Keep up the great work!"*
>
> *"No suggestions - I think the format is generally really good. Wish I could make more!!"*
>
> *"…I believe this type of initiative is necessary and I thank you for the organization and effort."*

Other comments and suggestions for improvement included the need to vary the days and times that the Share and Learn events are offered so that it can better fit into different schedules, and to ensure that there is more time for question and answer or casual discussion during the events. In particular, participants offered the following suggestions:

> *"It would be helpful to use different days throughout the semester. Currently, if I have a conflict with the day and time, I will have that conflict for the whole semester and won't be able to attend."*

"I haven't been able to attend many share and learns because they haven't fit into my schedule."

"Make sure that share and learns are scheduled to allow time for Q&A or maybe schedule a follow-up casual discussion a week later?"

Discussion:

This study highlights that the BEEC virtual community of practice and specifically the Share and Learn events allow participants to share resources, create collective knowledge, and perform networking and interprofessional collaboration. Our qualitative and quantitative assessment of the Share and Learn events confirmed this through participant and presenter data analyses, participant surveys, and website content engagement statistics.

Broader Impact

The broader impact of the Share and Learn events can be measured in the unique engagement of participants and universities that attended. These events have engaged over 90 unique participants, some teaching-focused faculty as well as individuals who belong to more traditional tenure-track roles. Additionally, Share and Learn events have attracted individuals from 52 unique national institutions and three international institutions - The University of British Columbia (Canada), University College London (UK) and Universidad de los Andes (Colombia). This level of engagement is promising for a growing community of practice. Based on the U.S. News World Report, there are a total of 183 institutions with a biomedical/medical engineering major and 15 with a biological/biosystems engineering [23]. Given this statistic, it can be stated that the BEEC Share and Learn events have reached roughly 27% of all national institutions.

Faculty from R1 institutions represent 76% of all participants engaged with the Share and Learn events. This is expected given how large R1 institutions are both in the number of faculty within them and the overall number of institutions. Presenters were more balanced between R1 and R2 institutions, 42% and 33%, respectively. This indicates that there was still a good representation of participants and presenters from non-research-focused universities during the events, as they made up 15% of the participants and 25% of the presenters. This shows that there was noticeable engagement with non-research or liberal arts institutions that teach engineering.

Participation and Presenters by Faculty Rank

Out of the 90 unique participants, most participants were assistant professors (35%), followed by associate professors (22%) and full professors (18%). It is important to note that most assistant professors belonged to a research-focused tenure-track role (22%) compared to the 12% that belonged to a teaching-focused role. These proportions reverse when looking at associate professors, where 8% of the participants held research-focused roles, while 14% held teaching-focused roles. It is interesting to note that full professors for each track participated equally (9%). It is surprising to find that such a large proportion of participants (39%) belonged to a research-focused role given the content of the events. In particular, the Share and Learn events were envisioned as a teaching focus seminar-style event, so finding that there was interest from

research track faculty is encouraging for the broader dissemination of evidence-based pedagogies and other teaching practices. This validates the argument that these events can impact the entire BME/BIOE community rather than only teaching-focused faculty within the community. Unfortunately, not much could be extracted from the lecturer or "other" category of educator roles. The authors acknowledge that the role of a lecturer is varied and often cannot be compared easily to the faculty promotion track, which limits the possibility of being able to draw conclusions from the analysis. In addition, the "other" category did not have enough samples to observe patterns properly. However, it is essential to note that the "other" category included graduate students and post-doctoral researchers, showing that younger educators are engaging with the community. This engagement means that these students and researchers are preparing for teaching in their future careers. An additional and exciting note is that all faculty ranks possessed a type of administrative role (e.g., program directors, chairs, or program coordinators). This shows how the Share and Learn events can impact participants and add value to programs and curriculums through potential administrative implementations.

The results from the analysis of the presenters show that there was an equal distribution from the research and education track (42%). This is not surprising given that in order to lead a presentation, there only needs to be a desire to share or collaborate with the community. It is interesting to note that assistant professors for both tracks represented only 33% of all the presenters (2 presenters each), but there was a shift in presenters when looking at the associate and full professor levels. Specifically, there were more associate faculty presenters in the teaching-focused roles (17% vs. 8%), but interestingly, this ratio flips when looking at the full professor presenter roles, 8% for teaching and 17% for research. These trends show a balanced mix of individuals leading the discussions. It is interesting to note that full research-focused tenure-track professors had a high level of participation. Lastly, presenters were also involved in administrative roles, with one administrator in the associate and another administrator having a full professor rank.

Website Engagement

The website for BEEC was created in September 2021 and contained a tab where all the Share and Learn event information resides, including upcoming meeting information and registration links as well as past event content. With the community's growth, more advertising through email, the website, and Slack, the specific page for the Share and Learn events has seen increased engagement in the past few months. This trend is another encouraging metric for participation and engagement in the Share and Learn virtual events.

Survey Results

Another more encouraging observation that can be made is in regards to the participant survey. With a 21% response rate (19/90 participants), it was observed that 55% of survey responses came from female faculty members. This trend is consistent with the Share and Learn event participation (53% female participants). The survey also revealed the broad experience found in the participants, with individuals having up to 25 years of experience in teaching while others

having less than a year. This broad teaching experience aligns with the Share and Learn goals of impacting the entire community, from experienced teachers to new ones.

The best BME textbooks and BME education funding opportunities were the two most popular events in the Share and Learn event series. The best BME textbooks event consisted of a workshop where participants filled out a shared document indicating what, in their opinion, were the best textbooks for each BME/BIOE subdomain (e.g., tissue engineering, cancer, imaging, biotransport, senior design). This shared document was sent out to the entire community and is accessible on the BEEC website [24]. The BME funding opportunities event was a presentation-style meeting where a full teaching professor shared their experiences with grant writing and named an array of specific grant calls with their respective requirements and time window. This presentation was also sent to the community and is accessible on the website [22]. Lastly, the Learning from the BME Podcast was least attended. This event was led by undergraduate students who recently graduated from their biomedical engineering program and were developing a podcast to engage students on industry positions and internships.

The last section of the survey results include an evaluation of impact by asking the participants how these events have added value to their professional development, teaching, and overall career. These results indicate some areas of improvement, with only 47% of participants showing value added to either their education or professional development, and 10% strongly disagreeing. This indicates that there needs to be better engagement with the community and participants to ensure that these events serve their needs. Furthermore, qualitative results from the survey suggest that the coordinators should vary when the events are offered each month to allow for more community members to be able to attend and provide more time for members to discuss the topics. The last survey question suggests a slightly better trend, with 63% indicating that the Share and Learn events add value to the participants' careers. However, it cannot be ignored that 15% of the survey respondents considered these events did not add value to their careers. Future work will be performed to assess how to better add value to these participants career through follow up interviews and surveys to develop better implementation and changes to the Share and Learn program and BEEC tools.

Conclusion:

This paper presented a new and ongoing community-led virtual Share and Learn event program within the Biomedical Engineering Education Community (BEEC). Through the analysis of participation and presenter data, it can be observed how impactful these kinds of events can be through understanding the faculty ranks of the participants and presenters, the number of universities engaged, and the overall engagement of the knowledge created by the program through website access. These no-cost activities can create a great deal of change in how new evidence-based pedagogies and teaching strategies are shared across the broader education community.

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