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The BUILD Mentor Community at CSULB: A Mentor Training Program Designed to Enhance Mentoring Skills in Experienced Mentors

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Abstract

The BUILD Mentoring Community (BMC) at California State University Long Beach (CSULB) was developed to enhance mentoring skills among our already experienced research faculty mentors. Designed in alignment with the published "Entering Mentoring" program, the 2015-2019 BMC trained 93 research mentors across 24 departments. Mentors discussed best practices in mentoring in a hybrid format during the first semester and completed a second semester independent project where refinements to their mentoring were piloted. Mentors were surveyed following BMC completion with a Qualtrics survey, and BMC-trained mentors (BMCT), BUILD non-BMC trained mentors (BNT), and non-BUILD (NB) faculty mentors and their students were surveyed using the Higher Education Research Institute (HERI) and Diversity Program Consortium (DPC) instruments. BMCT mentors found that the workload of the BMC was reasonable, and 86% of mentors would recommend the BMC. Most (97%) BMCT mentors stated that they were likely to make a change in their mentoring as a result of BMC participation. Both BMCT and BNT mentors rate mentoring undergraduates more highly, and present work with undergraduates more frequently, than NB mentors. Students perceive BMCT mentors as providing a better mentoring experience and being better at increasing motivation and confidence, setting expectations, and acknowledging contributions compared to the ratings of students without BMCT mentors. While students rated BMCT mentors better on many key skills taught in the BMC, some learning goals did not produce a difference, including discussing and valuing diversity, using active listening and constructive criticism, and employing communication strategies. Therefore, many aspects of mentor training at CSULB can improve. Overall, instituting online/hybrid mentor training enhanced mentoring skills even among experienced mentors, particularly when mentors were asked to apply and assess new mentoring practices as part of the program.

Introduction

Participation in undergraduate research provides multiple benefits to students, including increasing graduation rate, remaining in sciences, enhancing scientific and analytical thinking,

increasing tolerance for obstacles and capacity for independent work (Lopatto 2004; Hernandez et al., 2018; Zydney et al, 2002; Hunter 2007; Ishiyama, 2007; Bauer and Bennet 2008; Anderson et al., 1995). These benefits extend to both majority students as well as underrepresented students in STEM fields (Hathaway et al., 2002, Sadler et al., 2010; Hernandez et al., 2018; Eagan et al., 2013). A key aspect of a productive undergraduate research experience is experiencing adequate mentoring (Thiry et al., 2011; Pfund et al., 2006); however, methods of mentoring undergraduate research students have been based largely on personal preference or prior experience of the research advisor with mentoring; historically few universities teach best practices in mentoring undergraduates as part of faculty development programs (Laursen et al., 2010; Pfund et al., 2006; Johnson et al., 2010). Indeed, research advisors of undergraduate mentees are often unaware of the pedagogical side of mentoring (Feldman et al., 2009), and don't always use best practices in mentoring undergraduate research students (Thiry and Laursen 2011, Baker & Griffin, 2010). Recent mentor training programs have made progress focusing on training mentors at research intensive universities, in clinical settings, or training graduate students and postdoctoral fellows (Pfund et al., 2013; Johnson et al., 2010). However, undergraduate research and the need for using best practices in mentoring occurs at large comprehensive universities as well. While the best techniques in mentoring hold true regardless of the environment, the focus and structure of both mentoring and faculty time differs between large public primarily undergraduate institutions and programs where faculty members are focused on graduate or professional mentees.

The National Institutes of Health "Building Infrastructure Leading to Diversity" (BUILD) program is part of a larger Diversity Consortium aimed at involving students in health-related research at primarily-undergraduate institutions serving diverse student populations. The overall goal of encouraging participation in undergraduate research at these targeted institutions is to ultimately enhance diversity among scientists in the biomedical and behavioral sciences. California State University Long Beach (CSULB), a large, public teaching-intensive and research-active university, was a recipient of the BUILD I award. CSULB serves over 37,000 students and is designated as both a Hispanic Serving Institution (HSI) and an Asian American/Native American/Pacific Islander Serving Institution (AANAPISI). Select faculty participating in health-related research across four CSULB Colleges (College of Natural Science and Mathematics; College of Engineering; College of Health and Human Services; College of Liberal Arts) were recruited to serve as mentors for BUILD students who applied to gain experience working with mentors running established research programs on campus prior to applying for graduate school. As part of the BUILD award, training in best practices in mentoring techniques was needed accommodate a range of faculty members mentoring diverse undergraduate BUILD researchers (Estepp et al., 2017).

The CSULB BUILD Mentoring Community is based on and follows all of the learning objectives of the evidence-based curriculum "Entering Mentoring" (Pfund et al., 2015), which allowed our faculty members to earn certifications of completion for NRMN Research Mentor Training. This

curriculum has been disseminated broadly through the National Research Mentoring Network (NRMN) and used by many BUILD sites (Spencer et al., 2018; Sorkness et al., 2019). The CSULB NIH BUILD program adapted the NRMN-promoted Entering Mentoring to a 10-week hybrid-training course called the BUILD Mentoring Community (BMC), which focuses on training experienced faculty members in best practices for mentoring undergraduate researchers. Participation in the BMC occurs over two semesters: the first semester includes both an online discussion group and a face-to-face intercultural communication workshop, while semester two is an independent project where participants pilot and assess refinements in their mentoring skills.

The hybrid learning in semester one takes place over 10 weeks, starting with one face-to-face meeting followed by eight weeks of online discussion, using the learning objectives of the Entering Mentoring program. BMC members read, discuss, and share personal expertise in key aspects of the Entering Mentoring program, including: Mentoring Philosophy, Aligning Expectations, Promoting Professional Development, Effective Communication, Equity and Inclusion, Assessing Understanding, Fostering Independence, Cultivating Ethical Behavior, and Creating a Mentoring Plan (Pfund et al; 2015). To accommodate the varied schedules of 9-13 faculty members across four colleges in each BMC cohort, the Entering Mentoring program was adapted in several significant ways. Instead of eight face-to-face hour-long meetings, the bulk of the discussion was conducted on an online discussion board using Google Groups. The facilitator of each cohort posted readings, tasks to try, and a question to address using the discussion board, and members were encouraged to comment on the answers of other faculty participants. The second major adaptation of the Entering Mentoring program was to achieve the learning objectives through asking participants to discuss their own experiences with the topic as opposed to using the examples and case studies provided by Entering Mentoring. Because our participants were all professors currently mentoring undergraduate researchers, and thus had considerable experience mentoring/being mentored, the organic discussion that formed around each topic was authentic and meaningful. For example, during the Equity and Inclusion week, participants were invited to share occurrences of marginalization in the laboratory witnessed, experienced, or shared by their students, or participants could offer comments on why diversity in research matters. Both of these discussion prompts generated rich conversation between participants and the facilitator. In addition to substituting real experiences for the provided case studies, the BMC program also converted some Entering Mentoring topics to tasks assigned for each week. For example, during the Effective Communication week, faculty members were provided with resources on how to actively listen and were tasked with trying out the techniques with their research mentees and reporting back to the discussion board on differences noted, if they would continue to use these methods, and how active listening may impact the experience of their mentees. Similarly, during the Aligning Expectations week, faculty members were asked to create and share mentor-mentee compacts, which were refined throughout the semester. Facilitators addressed comments of all participants and generally guided the discussion each week. The facilitators were selected from BMC "alums" who were

particularly active and engaged during the online discussions, and each semester a new facilitator was selected.

To maintain the focus on best practices in mentoring beyond the first semester of the BMC, the CSULB BUILD program created a second semester of mentor training where participants use new or refined skills from the BMC to pilot a mentoring-related project. This independent project ranged in scope and complexity and was created by the BMC member in conjunction with the BMC facilitator with the goal of making a positive change in how each faculty participant mentored research students. Mentors put new ideas into practice and then assessed their effectiveness with their undergraduate research team. Examples of projects included deploying the mentor-mentee compact and surveying research students to determine if the compact: enhances clarity or communication; institutes presentations at laboratory meetings with group feedback; sends students to present at local meetings in a laboratory where few students had presented data in the past; and re-writes protocols and the system of how students use equipment in the laboratory to reduce mistakes. Faculty members were explicitly told that the project could be simple, but that the results should be able to impact future mentoring. At the end of the second semester, each faculty member then reflected on the mentoring change that was made and submitted a final report detailing the results of the project. When faculty members completed both semesters of the BMC and successfully submitted a final project report, they were eligible for a $1,000 stipend to honor the two-semester commitment to enhancing their mentoring.

We hypothesized that having a two-semester targeted mentor training program would enhance the self-efficacy of mentoring skills among our BMC-trained mentors, that mentors would find the targeted program to be both beneficial and achievable during a typical academic semester, and that mentors would make changes in how they mentored as a result of BMC training. We also hypothesized that there would be a difference between BUILD BMC-trained mentors as compared to BUILD non-BMC-trained, and non-BUILD non-BMC-trained faculty on multiple metrics related to skills learned in the BMC and their experience with mentoring. In addition, we hypothesized that BMC training of mentors would impact the perception of students about mentoring relationship and key mentoring skills of their faculty mentors.

Methods

Student and faculty IRB-approved survey data were assessed, in addition to program-collected data, to discover patterns in responses to faculty and student perceptions about mentoring. Existing survey data primarily originated from the CSULB BUILD program-developed BMC surveys through Qualtrics, and was supplemented by one year of the Diversity Program Consortium-developed faculty and student surveys which were administered annually.

BMC Surveys. Faculty (*N* = 93) trained mentors were requested to complete surveys on the Qualtrics Survey platform immediately following BMC participation, six months after BMC completion and following the second semester project. Select mentors were surveyed 15 and 21 months following initial BMC completion. Not all mentors took every survey, and not all mentors answered every question. Missing responses were not counted. Response rates varied between 79.5% to 90.3% (*M* = 87%) for all questions except for the Skill Rating Self-Assessment where the response rate was 68% for completion of the entire matrix. Faculty members in the Spring 2015 cohort were asked to complete an additional survey at 22-months post BMC completion (N=8) to determine if practices learned in the BMC were still in use.

DPC Faculty Surveys. In Fall 2016, CSULB faculty members who responded to previous baseline surveys and new faculty in the College of Natural Science and Mathematics, College of Engineering, College of Liberal Arts, and the College of Health and Human Services, were invited to participate in an online Diversity Program Consortium (DPC) survey developed by UCLA's Higher Education Research Institute (HERI) and administered by UCLA's Coordination and Evaluation Center (CEC) called the HERI Faculty Survey. Faculty who participated in this survey were asked questions related to their view of a mentor's role, participation, encouragement, and engagement with respect to students' research, and their perspective regarding the overall quality of their mentorship with undergraduate students.

Of those who were invited (*N* = 373), 168 responded, but only 129 submitted complete data (45% response rate). Also, not all faculty answered every question, nor did they indicate if they mentored undergraduate students. Following the close of the survey, survey responses were distributed back to the BUILD sites for analysis. Of the 129 who completed the survey, only 107 indicated they mentored undergraduate students. Thus, this study utilized responses from 45 BUILD faculty members of which 33 (73%) had been BMC-trained (BUILD BMC Trained; BMCT) at the time of taking the survey, compared to 12 (26%) BUILD faculty who had not yet been BMC-trained (BUILD Non-BMC Trained; BNT), in addition to 62 Non-BUILD faculty (NB) who were not offered training.

The faculty ranged in academic rank from Assistant Professor to Professor where 45% of BMCT and 75% of BNT faculty were Assistant Professors, compared to 29% of NB mentors who were Assistant Professors. Fifty-seven percent of BMCT faculty selected the female gender option, which is similar to 60% of BNT mentors and 59% of NB faculty members. Of those who responded to the race/ethnicity group question, BMCT faculty indicated their race/ethnicity group as White (50%), followed by Asian or Pacific Islander (41%), and Two-or-more races (4%). The distribution was similar for BNT faculty, however 4% identified as an unknown race/ethnicity. Comparatively, Non-BUILD faculty mostly identified as White (66%), followed by Asian and Pacific Islander (14%), Two-or-more races (8%), Hispanic (8%), Unknown race/ethnicity (4%), and Black or African American (4%).

DPC Student Surveys. During the academic year of 2017, CSULB undergraduate students all BUILD students and students who had taken a baseline survey in a previous year or who attended BUILD events in the past were invited to participate in a Diversity Program Consortium (DPC) survey developed and administered by UCLA's Coordination and Evaluation Center (CEC) called the Student Annual Follow-up Survey (SAFS). Students who participate in the survey were asked questions related to their perception of their faculty mentors 'skills on academic advising, as well as their mentors 'roles, and expectation and satisfaction with their mentor.

Six-hundred and ninety-seven students took the survey, but not all students answered every question nor did they indicate if they had a primary faculty member. Following the close of this survey, responses were distributed back to the BUILD sites for analysis. This study uses responses from 93 BUILD students of which 54 (58%) had mentors who had been BMC-trained at the time of taking the survey and the remaining 39 (42%) students either did not have a mentor who was trained or their mentor-mentee identification and timing of training could not be identified.

Of those who responded to the race/ethnicity group question, students with BMCT-trained mentors indicated their race/ethnicity group as Asian or Pacific Islander (65%), followed by Hispanic (41%), White (39%), and Black or African American (7%). The distribution of those was similar for those with non-trained faculty where (80%) identified as Asian or Pacific Islander, Hispanic (41%), White (39%), and African American (9%).

Of the 47 students whose faculty mentor completed the BMC training at the time of the student taking this survey, 100% were first-time freshmen, and 98% were currently enrolled full-time. Comparatively, the 13 students whose mentors were not trained were all first-time freshmen as well (100%) and all were currently enrolled full-time (100%).

Data Collection and Storage Procedures. Secondary data analysis was used to examine demographic and survey data collected with consent from participants in the Consortium-Wide Evaluation Plan (CWEP) study, of which CSULB BUILD is a part. No random assignment was used with the collected data, making this study a quasi-experiment. BMC-collected data are stored in a university-approved Qualtrics account and all other survey data are stored as SPSS files on an encrypted server maintained by Academic Technology Services at CSULB. After submitting a request to use such data for research purposes from the BUILD program, a protocol for the use of existing data for research, was submitted the local Institutional Review Board and IRB approval was obtained (IRB Net ID # 1440139-1).

Data Analysis. In order to clean, code, and collect descriptive statistics and frequencies the DPC student and faculty survey datasets (The 2017 SAFS and HERI Faculty survey), IBM SPSS Statistics for Windows, Version 25.0 was used. Data were missing at random and those with missing data on any item were excluded if data was missing on any variables of interest. The

SPSS statistical software version 25.0 provided sample, mean, and standard deviation, and ANOVA and t-test analyses were conducted using Prism 4 statistical software (GraphPad Software, Inc., San Diego, CA).

For the faculty survey data hypotheses one through four, the dependent variable was faculty status, a non-ranked categorical variable, with three levels/groups: BUILD BMC-trained (BMCT), BUILD Non-BMC-trained (BNT), and Non-BUILD Non-BMC-trained (NB) faculty, to test differences between groups using a one-factor analysis of variance (ANOVA). The analyses for each hypothesis had unique independent variables: frequency of providing students with academic information; overall experience working with undergraduates; overall quality of mentoring relationships with undergraduates; belief that a racially/ethnically diverse campus enhances educational experiences for all; frequency of presentations with undergraduates at conferences; and frequency of discussing academic performance with students respectively. Assumptions of normality were met and data were checked for homogeneity of variance prior to running analyses.

Utilizing alternative statistical methodology, hypotheses related to students 'overall ratings of their mentor samples t-tests were also used to test differences between students with faculty mentors who were either BMC-trained or non-BMC-trained. These three items were asked individually on the Student-Annual Follow-up Survey. For hypothesis 12, participants were asked "How would you rate the overall quality of the mentoring you received from your primary mentor". Response options were 1-7 where 1 = Very Low, 4 = Average, and 7 = Very High. Students were asked "How satisfied are you with the mentoring you are receiving from your primary mentor" for hypothesis 13 with response options 1-7 where 1 = Not at all and 7 = Extremely. Finally, students were asked "To what extent do you feel your primary mentor is meeting your expectations" with response options 1-7 where 1 = Very Low, 4 = Average, and 7 = Very High. The survey did not provide a "N/A" option for any of these items, however, if students skipped these questions or were not asked because they did not identify that they had a primary mentor more senior to them earlier in the survey. Prior to running analyses, data was checked for homogeneity of variance.

Additionally, independent samples t-tests were used to test mentor differences in students ' ratings of mentor skills between two independent groups: students with faculty mentors who were either BMC-trained or Non-BMC-trained. All eleven items were extracted from a 26-item Likert-style scale instrument where survey participants were asked "Please rate how skilled you feel your primary mentor was in the following areas" with response options 1-7 where 1= Not at All and 7 = Extremely. A "N/A" option was also available. Students who reported "N/A" for any item of interest, or students who did not respond to these items were excluded from analysis. Students who did not initially report they had a faculty mentor were not asked faculty mentor-related questions. This includes three students with BMC-trained mentors. It is unknown why they did not list they had a mentor more senior to them, but they were excluded from these

analyses. Students with "not applicable/ don't know" mentor training were combined with "no" mentor training for a total of 210 Non-BMC-trained compared to 47 BMC-trained faculty mentors. Data was checked for homogeneity of variance prior to running t-tests.

Results

BMC Faculty Surveys. *BMC Faculty Surveys Compilation of Nine Semesters of Post BMC Semester I Surveys.* During the nine semesters of the CSULB BMC (Spring 2015-Spring 2019), 93 BUILD-mentors were trained across four colleges from 24 different departments; this represents 100% of CSULB BUILD faculty mentors with BUILD mentees completing CSULB's BMC mentor training program. Seven additional faculty members were invited to start the BMC, but dropped out during semester one due to a variety of reasons (health, personal, leaving the university, leaving the BUILD program), none of these seven returned to BUILD or mentored BUILD mentees. Of the 93 faculty members who completed the first semester of the BMC, 96% completed the BMC second semester project; the four that did not complete cited personal, health, leaving for administrative positions as the reason to not complete the report and not collect the stipend. Faculty participants reported spending over 600 hours collectively on the first semester of the BMC; with 18.9% reporting 7-8 hours total and 56.8% reporting spending over 8 hours total on the BMC (Figure 1A). The BMC workload was generally considered feasible by faculty members during the semester, with 73.8% of faculty respondents reporting that the BMC workload was 'reasonable '(Figure 1B). Overall, faculty mentors found value in the BMC experience, with 86% of respondents probably, likely, or very likely to recommend the BMC to a colleague (Figure 1C). Faculty mentors also reported that the BMC elicited change in their mentoring plan or style, with 97% of respondents responding that they would probably, likely, or very likely make a change in their mentoring as a result of BMC participation (Figure 1D).

Faculty mentors were asked to rate their skills prior to and following completion of the first semester of the BMC (Figure 2). Improvements in all of the key learning objectives defined by the Entering Mentoring curriculum were noted, with the greatest gains made in articulating a mentor/ mentee compact, maintaining effective communication, aligning expectations, and addressing equity and inclusion (Figure 2).

BMC Faculty Surveys 22-months following completion of the BMC. To determine if techniques taught in the S15 BMC were persisting, we surveyed S15 BMC participants 22-months post completion of training. Surveys were sent to the eight participants in that cohort, and 100% of the mentors responded. This response rate provided us with insight into the persistence of the skills learned. When participants were asked if they currently use the skills learned in the BMC in their current mentoring practice, 100% of mentors responded affirmatively, though frequency varied across participants, among the choices of "always" (25%), "most of the time" (37.5%), "about half of the time" (12.5%), and "sometimes" (25%). When asked specifically about the mentor-mentee compact that mentors created at the end of the BMC, 62.5% responded that they currently use this compact in their research program.

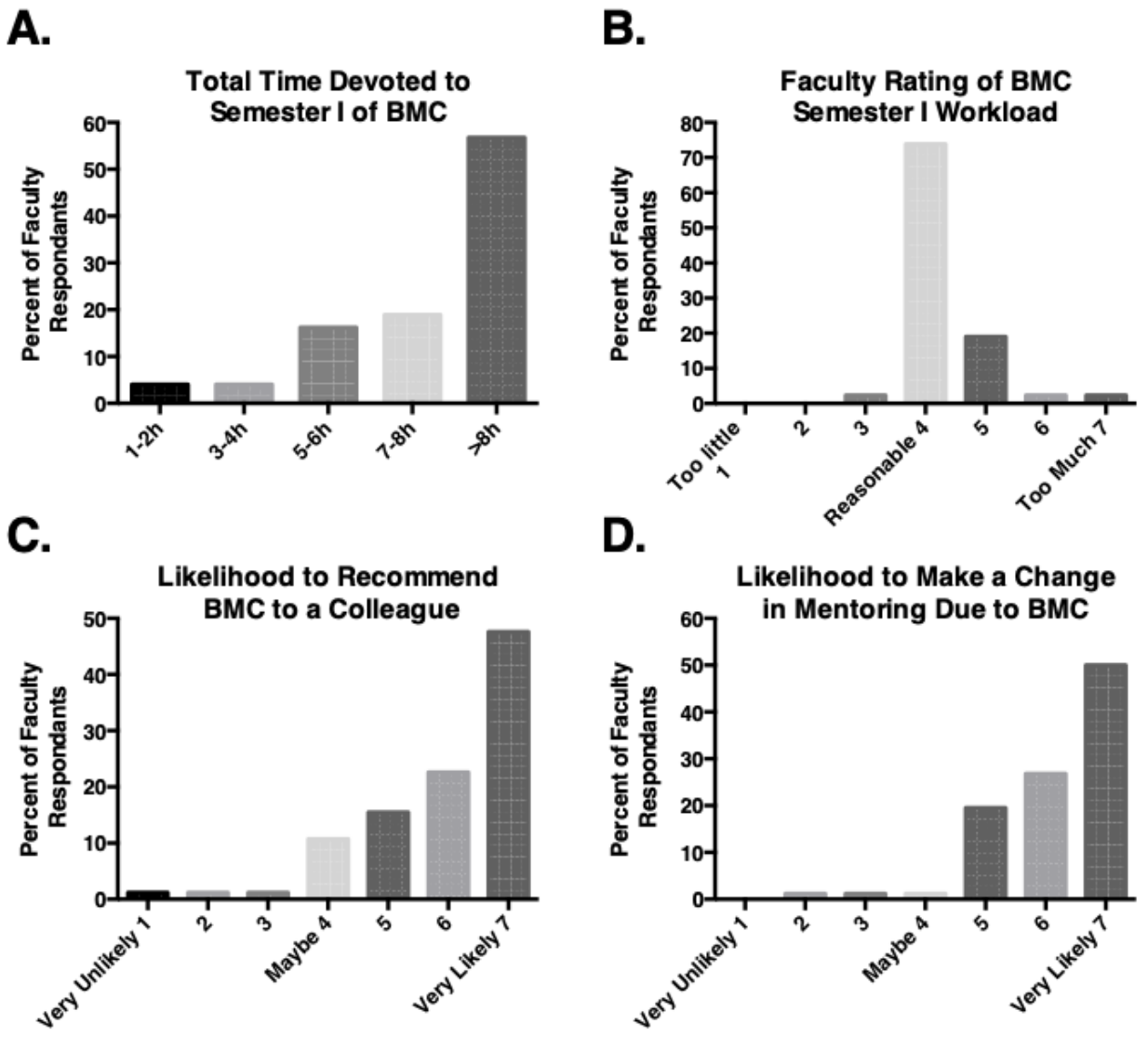

Figure 1: Faculty responses to survey at the conclusion of semester I of the CSULB BMC. Response of faculty members at the conclusion of semester I of the CSULB BMC presented as a percent of the total number of respondents for each question, including: A)total number of hours devoted to the BMC, B) rating of the workload of the BMC, C) the likelihood of recommending the BMC to a colleague, and D) the likelihood that the faculty member would make a change in his/her mentoring plan or style as a result of BMC participation.

Most mentors (50%) use the compact with students as they join the research team, and 25% of mentors reported that they refer to the compact if there is an issue. While 25% of mentors never provided their students with the compact, 12.5% of mentors responded that every student in their research laboratory have a copy of the mentor-mentee compact.

To determine if the primary learning goals of the BMC were retained 22-months post BMC completion, mentors were asked about specific skills that were discussed in the BMC. When asked about using BMC skills promoting diversity and equity in their research team, 87.5% of mentors responded that they used these skills "all the time" (50%), "fairly regularly" (25%), or "sometimes" (12.5%). One mentor (12.5% of the sample) reported rarely using these skills; however, no mentor responded that they hadn't learned anything about promoting diversity and equity in the BMC. When asked about promoting professional development in their mentees, 100% of mentors reported that they use skills learned in the BMC "all the time" (28.6%), "fairly regularly" (57%), or "sometimes (14.3%), suggesting that the skills for professional development promotion learned in the BMC were a valuable addition to their mentoring practice.

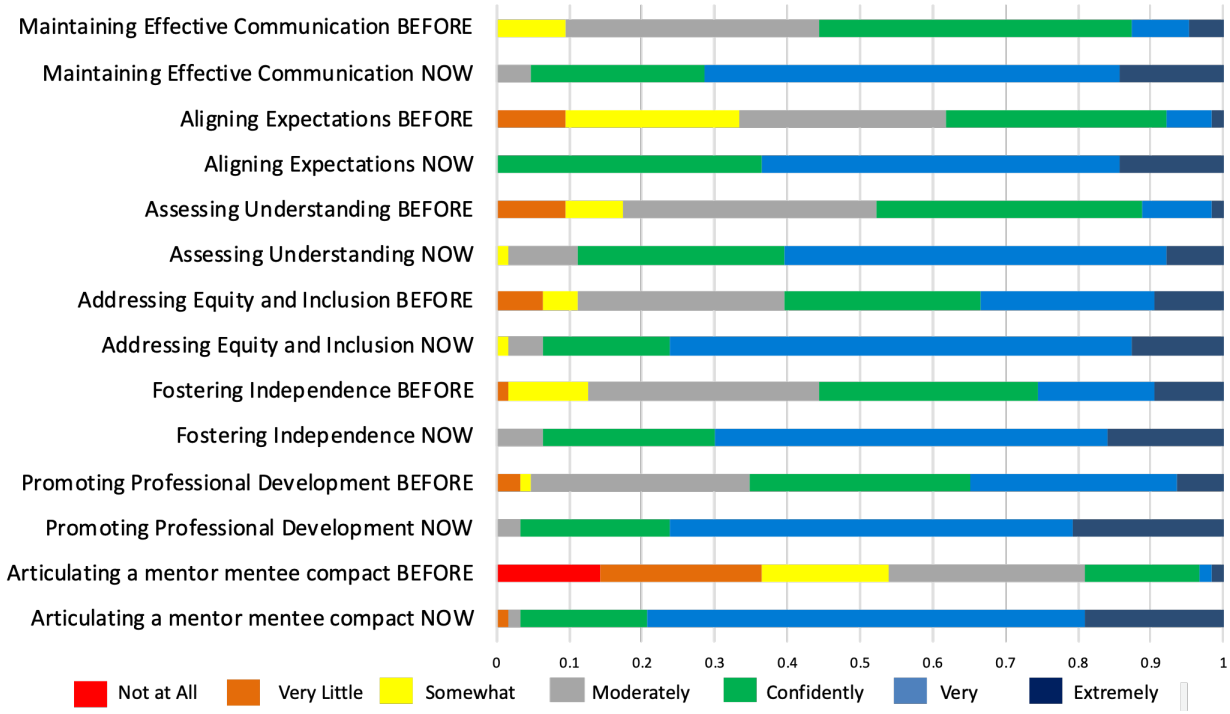

Figure 2: Faculty respondents self-evaluate confidence in their specific mentoring skills identified by the Entering Mentoring Program as key learning objectives prior to and after completing the BMC. Data are presented as a percent of the total responses for each individual question.

DPC Faculty Surveys. When faculty groups were asked how often they provided information to their research mentees about non-research related academic opportunities, BMC faculty training or BUILD membership did not influence self-reported ratings. BMCT faculty (M = 2.64, SD = 0.48) performed similarly to BNT faculty (M =2.58, SD =0.52) and to NB faculty (M =2.58, SD =0.56), $F(2,104) = 0.14$, p =0.86, *partial* $n^2 = 0.00$. (Figure 3A). When asked about experiences working with undergraduates, both BMCT (M =4.39, SD =0.56) and BNT (M =4.13, SD =1.08) faculty reported higher ratings than NB faculty (M =3.31, SD = 1.37), $F(2,145) = 11.37$, $p < .001$, *partial* $n^2 = 0.14$ (Figure 3B). When faculty rated their overall quality of the mentoring

relationship with undergraduate trainees, faculty training influenced self-reported ratings, $F(2,111) = 7.64$, $p < .001$, *partial* $n^2 = 0.12$ (Figure 3C). BMC ($M = 3.68$, $SD = 0.48$) and BNT ($M = 3.80$, $SD = 0.42$) faculty reported higher ratings than NB faculty ($M = 3.25$, $SD = 0.65$). Responses about beliefs that a diverse student body enhances education experiences for all students did not differ across faculty groups. There was no difference between BMCT ($M = 3.68$, $SD = 0.54$), BNT ($M = 3.92$, $SD = 0.29$) and NB faculty ($M = 3.76$, $SD = 0.50$) training on their view of how a racially/ethnically diverse student body enhances the educational experience of all students, $F(2,125) = 1.02$, $p = 0.37$ *partial* $n^2 = 0.02$. (Figure 3D). The frequency with which faculty identified that they present at conferences with undergraduate students differed across faculty groups, $F(2,77) = 21.76$, $p < .001$, *partial* $n^2 = 0.36$ (Figure 3C). BMCT ($M = 4.18$, $SD = 0.86$) and BNT ($M = 3.50$, $SD = 01.37$) faculty reported higher ratings than NB faculty ($M = 2.13$, $SD = 1.52$) (Figure 3E). Finally, when faculty identified how often they discuss academic progress with students, neither BMCT training nor BUILD membership influenced self-reported ratings, $F(2,77) = 0.21$, $p = 0.81$, *partial* $n^2 = 0.00$ (Figure 3F). BMCT ($M = 2.57$, $SD = 0.57$) and BNT ($M = 2.67$, $SD = 0.52$) faculty reported higher ratings than NB faculty ($M = 2.52$, $SD = 0.59$).

DPC Student Surveys. *Student perception mentoring.* Students with BMCT mentors rated their mentor higher than students with mentors without BMC-training on the overall quality of mentorship received, and their expectations being met by their mentor (Table 1). The overall satisfaction with mentoring received by students approached statistical significance (p=0.0523); however, was not significantly different between students with a BMCT mentor as compared to students with a mentor without BMC training.

Student Perception of Mentor's Skills and Abilities. Students with BMC-trained mentors rated their mentor higher than students with mentors without BMC-training on whether they felt motivated by their mentor and whether they felt that their mentor acknowledged their contributions to the research project (Table 2). Similarly, students with BMC-trained mentors rated their mentor higher than students with mentors without BMC-training on whether their mentor builds their confidence (Table 2). In contrast, no difference was noted between students with BMCT as compared to non-BMC-trained faculty mentors on how skilled they perceived their mentors to be with active listening, providing constructive feedback, or use of specific strategies to improve communication (Table 2). Students with BMCT faculty mentors rated their mentor's skill on setting clear expectations and aligning mentee and mentor expectations higher than students with faculty mentors who had not received BMC training; however, not difference was noted between mentor groups when students rated their mentor's ability to work with the mentee to set research goals (Table 2). No differences were noted between mentor training groups on student perception of their mentor's skill discussing diversity issues or respecting cultural differences (Table 2).

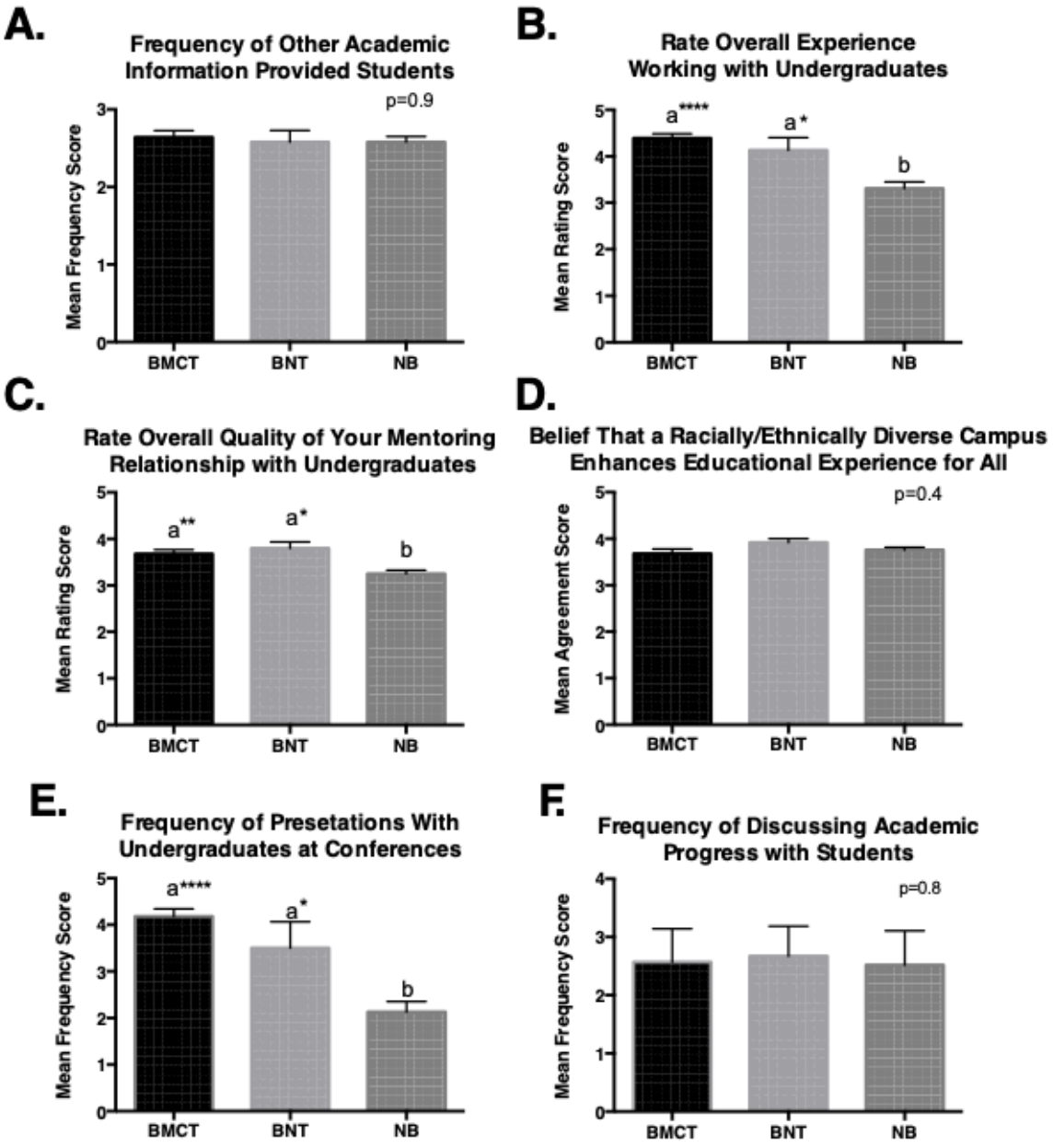

Figure 3: DPC Faculty Survey Results illustrate differences among BUILD faculty by BMC training (BMCT) or Build without BMC training (BNT), as compared to faculty not enrolled in BUILD (NB) on A) faculty respondents 'rating of frequency of providing academic information not related to research to students, B) faculty respondents 'overall experience working with undergraduate students, C) faculty respondents ' rating of the overall quality of their mentoring relationships with undergraduate students, D) faculty respondents beliefs that a racially/ethnically diverse campus enhances educational experiences for all, E) frequency of conference presentations where faculty present with undergraduate students, and F) frequency of discussion of academic progress (outside of research) with students. Columns that share the same letters do not differ significantly ($p>0.05$); columns with different letters differ significantly, with (*) indicating a significant difference of $p<0.05$ as compared to NB, (**) indicating a significant difference of $p<0.01$ as compared to NB, (****) indicating a significant difference of $p<0.0001$ as compared to NB.

Discussion

In response to the needs of the BUILD grant, CSULB created and implemented a novel, hybrid, two-semester research mentor training program based on the evidence-based Entering Mentoring curriculum. The program was tailored to meet the needs of experienced faculty members mentoring primarily undergraduate research mentees at our large, public comprehensive university. This was the first time that mentoring skills had been addressed specifically as part of faculty development at CSULB, and the results suggest that instituting a mentor training program enhanced mentoring skills even among experienced mentors. Over the course of nine semesters, 93 faculty members successfully completed the BMC, representing 100% of all CSULB BUILD mentors with student mentees. Most BUILD mentors have multiple students (BUILD and non-BUILD) in their research programs, and continue to have students after the BMC training is complete, so the impact of this training reaches hundreds of students on our campus.

It was important to the CSULB BUILD program to use an evidenced-based curriculum for research mentor training, and the updated Entering Mentoring program distributed by NRMN provided this validated platform. It was equally important for our campus to tailor the program to best fit the needs of our BUILD faculty members. The hybrid online discussion model works well for busy faculty with incompatible schedules for face-to-face meetings. While some faculty members shared that face-to-face meetings would be preferable, others commented that the online environment aided in their discussion and sharing since they could respond thoughtfully at their convenience. The first and last meetings of semester one of the BMC were scheduled for face-to-face, and often more than one meeting was needed to accommodate the busy schedules of faculty from multiple colleges. Conversation across participants varied by cohort, with some cohorts engaging in multiple rounds of comments following each post, and other cohorts where the majority of faculty members responded as required to each post, but did not respond to posts of other participants. The hybrid discussion board environment certainly has limitations, but this adaptation of the Entering Mentoring curriculum may prove useful to other universities where scheduling in 8 hours of faculty face-to-face workshops is a challenge.

The CSULB BMC provided mentor training to faculty members varying in rank, experience, and research program size. Research programs differ across disciplines, and because the BMC trained faculty members across four colleges and 24 different departments, the nature of the research varied considerably. While this occasionally proved to be a challenge, as some methods shared by laboratory scientists were not necessarily transferable to behavioral scientists, and vice versa, this variation also offered the opportunity to share novel mentoring tips. Comments from faculty members in each cohort expressed gratitude for hearing about new ways to approach situations with research mentees. Interestingly, since the majority of faculty members stated that they would make a change in their mentoring practice as a result of participation in the BMC, this meant that even experienced full professors were learning something new. Facilitators were

also coached to remind more senior members of each cohort that they served as mentors to the more junior members and that sharing their years of experience could help others in the cohort. Formal research mentor training is a relatively new addition to faculty development practices (Laursen et al., 2010; Pfund et al., 2006; Johnson et al., 2010); yet our data add to the conclusion that this investment can benefit students and faculty engaging in the high impact practice of hands-on-research (Bean et al., 2014; Espino & Zambrana, 2019).

One enduring challenge of faculty development programs is transferring the excitement about material learned in a one-time workshop to change the day-to-day practice of the new skills learned. The "Apply It" second semester mentoring project takes the BMC beyond the typical workshop and puts learning into practice- providing lasting change and tangible outcomes. While faculty participants were not required to meet formally during the second semester, the ability to discuss the project with the cohort facilitator or other cohort members was made clear, and all participants were required to complete the second semester project, submit a report, and complete one two-hour multi-cultural communication workshop to be eligible for the stipend. While this stipend was a motivating factor to some faculty members, and 96% of faculty members completed all tasks to earn the stipend, this reward arrived after two semesters of work on mentoring, a large commitment. Comments provided on the Qualtrics survey suggest that faculty participants gained skills that they would put into practice, indeed, when the first semester cohort was surveyed 22-months following completion of the BMC, all participants were using skills at least some of the time. These data suggest that teaching best practices in mentoring can have a lasting effect, and the second semester project can help to cement these skills into the daily mentoring practice.

While BMC participation was required for any BUILD mentor to have BUILD student mentees, to apply for BUILD funds, or to receive the BUILD mentor appreciation funds, one goal was to keep the BMC relevant and faculty-driven. To mitigate the 'required 'top-down aspect of the BMC, CSULB BUILD leadership selected BMC 'alums' to serve as leaders for each cohort, and appointed a new leader for each new cohort from Spring 2016 through Spring 2019. The leaders were selected from the different colleges participating in the BUILD program and each leader was provided with all the resources needed to run a successful BMC to maintain consistency of the program. The decision to incorporate multiple leaders allowed the BMC to develop and improve organically and the shared ownership across our university has prevented some of the resistance observed to other required training programs on campus. In addition, the BMC provided a discrete university-level leadership opportunity for the faculty member serving as facilitator, often the first such opportunity for the junior faculty members selected as leaders.

Participation in the BMC impacted faculty perception of mentoring in multiple areas (Figure 3). While participation in the BUILD program as a BUILD mentor likely influenced the inclination of individual faculty members for research with undergraduate students, there was variation in the degree of difference when mean scores of BUILD faculty members were compared with NB

faculty. Mean ratings across a 4- point Likert scale (poor, fair, good, excellent) for both the overall experience and overall quality of mentoring differed between BUILD and non-BUILD faculty members; however, the degree of difference was greater among BMC-trained BUILD faculty members in both cases, suggesting that participation in the BMC influences how a faculty member perceives the mentoring relationship (Figure 3B-C). The same pattern was noted when faculty members were asked about the frequency of presenting with undergraduate students at conferences (4-point Likert scale; Figure 3E). All CSULB BUILD mentors are required to have their trainees present at conferences (local, regional or national), so the difference between the BUILD and NB faculty may be due to this requirement. Interestingly, the change in the degree of difference (BMC vs NB $p<0.00001$; BNT vs NB $p<0.05$) noted between BMCT faculty members and BUILD faculty who had not yet completed the BMC suggests that participation in the BMC program where professional development and fostering independence are key topics may further influence faculty members to present with undergraduate students (Figure 3E). Other key topics discussed in the BMC, such as the frequency of passing on non-research related information to undergraduate mentees (Figure 3A) or discussing academic progress with students in the research program (Figure 3F) did not show a significant difference across BUILD or non-BUILD faculty members. These scores were also not particularly high with means suggesting a less frequent occurrence of these discussions. As mentor training continues to evolve at CSULB, it will be important to purposely highlight the need to share opportunities outside of research with students and to discuss grades and progress in classes each semester with mentees. Mentors can best guide their mentees when they fully understand the academic situation, and can pull back on research duties if a student is struggling. Finally, faculty across CSULB, regardless of BMC training or BUILD status were consistently positive that a racially/ethnically diverse campus enhances the educational experience for all students (Figure 3F). While discussing diversity and inclusion is a key aspect of the BMC and is the goal of BUILD in general, it may be that our diverse campus has positively affected faculty members in this regard, and it is not possible to tease out the impact that BUILD has had on our campus.

BMC training impacted student perceptions of mentor quality and mentoring skills across a variety of measures. Students with BMC-trained mentors rated their overall mentoring experience (Table 1) as well as their mentor's ability to motivate them, acknowledge their contributions, build their confidence, and set and align clear expectations higher than students with mentors who had not completed BMC training (Table 2). These skills are aspects of the learning goals of the BMC, and are key aspects for mentor-mentee compacts. While the faculty groups for the student surveys could only be divided into faculty mentors who had completed the BMC as compared to faculty mentors who had not completed the BMC (thus including both BUILD and non-BUILD mentors), differences in student perception of these faculty groups were still observed. Mentoring skills gained from the BMC also improved the overall perceived quality of mentoring students received and student expectations of their mentor (Tables 1 and 2).

Table 1. Group Differences for Mentor-related Overall Ratings Between Students with Faculty Who Did Receive BMC Training and Those Who Did Not Receive BMC Training

	BMC-Trained		Non-BMC-Trained					
Mentor-related Ratings	*M*	*SD*	*M*	*SD*	*df*	*t*	*p*	*Cohen's d*
Quality of Mentoring Received	6.24	0.96	5.46	1.51	56	2.26	0.014*	0.62
Satisfaction with Mentoring Received	6.20	1.10	5.54	1.76	56	1.65	0.0523	0.45
Expectations Met by Mentor	6.02	1.22	5.23	1.88	56	1.813	0.0376*	0.50

Note. P-values with * are significant at p < .05 and p-values with ** are significant at p <.01

Interestingly, student ratings did not differ between faculty groups on key mentoring skills taught in the Entering Mentoring program such as active listening, providing constructive feedback, and using specific strategies to better communicate (Table 2). It may be that more emphasis needs to be placed on learning these skills, that faculty mentors need more time incorporating these skills into their daily mentoring practice, or that students may not be adept at identifying use of these particular skills. Despite faculty respondents stating that a racially and culturally diverse campus enhances the educational experience for all students, students did not perceive a difference across faculty training groups when asked if their mentor discusses diversity issues or values and respects cultural differences. In addition, the average rating by students is considerably lower (2.80-2.89) when compared to means of other items on the perception of mentor skill survey where means range from 5.86-6.26 (Table 2). This suggests that despite a willingness of the faculty to support a diverse campus, more needs to be done so that the students feel that support. Additional resources into how to discuss issues of diversity, equity, and racial/cultural differences with students and how to demonstrate that diversity is valued should be incorporated into future mentor training programs at CSULB. While matching racial background between mentee and mentor has been extensively shown to be less important than a true interest in the mentee's professional development within the discipline (NASEM, 2019; Lee, 1997; Brown et al., 1999; Siple et al., 2015), understanding, and surveying participants in terms of mentor/mentee matching of cultural background and identity could also be an important update. Overall, the findings from the student survey data support further investment in mentor training programs as programs like this help both faculty and students to better meet institutional goals of incorporating undergraduates into effective hands-on research programs. Future researchers should consider student outcomes as a result of mentorship received such as time to graduation, end of term and cumulative grade point averages, and retention within major and within university.

Table 2. Group Differences for Mentor-related Skills Between Students with Faculty Who Did Receive BMC Training and Those Who Did Not Receive BMC Training

	BMC-Trained		Non-BMC-Trained					
Mentor-related Task	*M*	*SD*	*M*	*SD*	*df*	*t*	*p*	*Cohen's d*
Mentor Motivates You	6.09	1.29	5.23	1.83	56	1.914	0.0303 *	0.54
Mentor Acknowledges your Contributions	6.24	1.17	5.15	1.82	56	2.59	0.0061 **	0.71
Mentor Builds your Confidence	6.00	1.46	5.00	1.68	56	2.1	0.0201 *	0.63
Mentor uses Active Listening Techniques	6.09	1.31	6.00	1.29	57	0.22	0.4138	0.07
Mentor Provides Constructive Feedback	6.22	0.99	5.69	1.25	57	1.61	0.0565	0.47
Mentor Employs Strategies to Improve Communication	5.78	1.55	5.00	1.68	57	1.57	0.0605	0.48
Mentor Works with You to Set Clear Expectations of the Mentoring Relationship	5.85	1.32	5.08	1.71	57	1.74	0.0434 *	0.50
Mentor Works to Align His/ Her Expectations with Your Own	6.13	1.17	5.15	1.77	57	2.37	0.0106 *	0.65
Mentors Works with You to Set Research Goals	6.26	1.12	5.77	1.69	57	1.23	0.1112	0.34
Mentor Discusses Diversity Issues with You	2.80	0.73	2.69	0.75	56	0.48	0.3174	0.15
Mentor Values and Respects Cultural Differences	2.89	0.49	2.69	0.63	56	1.219	0.1139	0.35

Note. P-values with * are significant at p < .05 and p-values with ** are significant at p <.01

Conclusion

Research mentor training matters and a formalized cross-campus program positively impacted the perception and practice of mentoring undergraduate research mentees at CSULB. Finding an evidence-based curriculum and then tailoring it to the specific needs of our campus yielded a program recommended by the majority of participants and effected change in mentoring practices across our campus. While the current BMC program was focused on mentors engaging undergraduate student mentees in research, our next goal is to create a more inclusive program for mentor training that incorporates all areas of research and scholarly and creative activity mentorship, as all disciplines can benefit from earning best practices in mentoring, particularly those that share best practices in respecting the diversity of students in our research programs.

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