



The national evaluation
of the NIH Diversity
Program Consortium

Data Brief

From the DPC Coordination and Evaluation Center at UCLA

May 2020

Biomedical Faculty Use of Student-Centered Pedagogy at BUILD Institutions – Baseline Findings for Hallmark FAC-17

SUMMARY: The use of student-centered pedagogy (SCP) is an approach that engages students as active participants in the learning process. Faculty use of evidence-based practices in teaching and mentoring is hallmark (FAC-17) of the NIH Diversity Program Consortium (DPC). Data from the 2016 Higher Education Research Institute (HERI) survey of faculty found that faculty at BUILD institutions who were BUILD-affiliated did not differ from other faculty at those institutions in their use of evidence-based SCP methods, but utilization of SCP does vary by academic rank, gender, and discipline. This baseline data on BUILD faculty shows that their use of SCP at the beginning of this program was similar to national averages.

Background

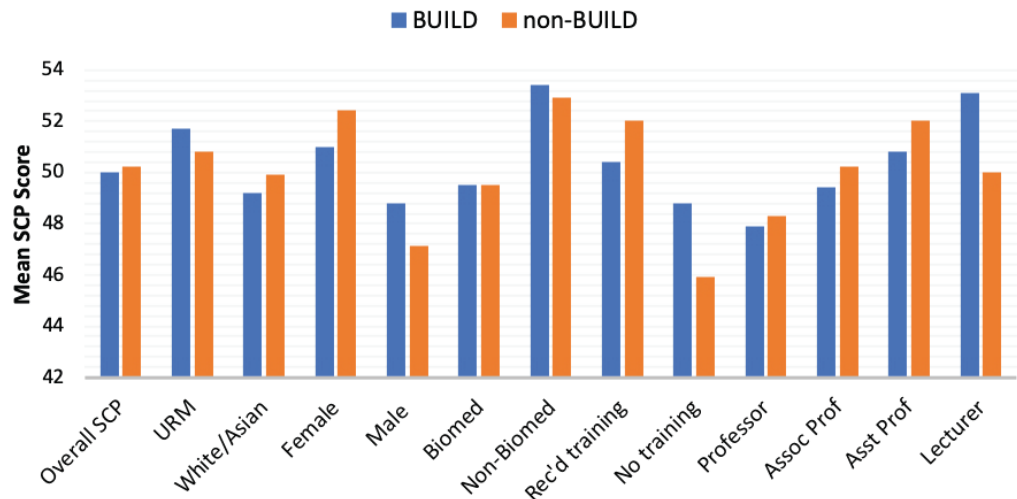
Intervention programs designed to retain undergraduates in biomedical majors commonly focus on the efficacy of special activities such as undergraduate research opportunities and targeted mentorship. For example, students who engage in undergraduate research experiences tend to persist in their STEM majors and express intentions to pursue graduate study in STEM at significantly higher rates than their peers who do not have those experiences.¹ Similarly, providing comprehensive mentoring reduces STEM student attrition.²

Research has also examined broader changes in classrooms, examining the relationship between faculty pedagogy and student success in STEM courses. Students in STEM courses where faculty rely more heavily on didactic lectures as the dominant form of pedagogy are less likely to persist in STEM majors relative to those with greater exposure to faculty who utilize student-centered pedagogy. The literature commonly refers to these as active learning strategies.^{3,4} Additionally, the traditional lecture model can lead to students completing their undergraduate education without skills that are important for professional success.⁵

Given this body of evidence, the DPC has identified “use of evidence-based practices in teaching and mentoring” (FAC-17) as an intermediate outcome of BUILD faculty interventions, also called a hallmark of success.⁶ DPC faculty hallmarks are tracked by the Higher Education Research Institute’s (HERI) national Faculty Survey,⁷ which is administered at all BUILD sites.

The 2016 HERI Faculty Survey asked teaching faculty in how many of their courses they used student-centered teaching practices (all, most, some, or none). The evidence-based strategies included in this analysis were: 1) Student presentations, 2) Student’s evaluation of each other’s work, 3) Class discussions, 4) Cooperative learning (small groups), 5) Experiential learning/ Field studies, 6) Group Projects, 7) Student selected topics for course content, 8) Reflective writing/ Journaling, and 9) Using student inquiry to drive learning. The responses were combined into a normalized score using national data so that the mean=50 and the standard deviation=10; a difference of 2 units is considered small and 5 is a medium effect size.⁷

Figure 1. Overall Differences in Faculty Use of Student-Centered Pedagogy (SCP) (n=765)



Biomedical Faculty Use of Student-Centered Pedagogy Variations by BUILD Involvement

BUILD faculty participants were assessed during the second year of the NIH-funded initiative (2016-17). This preliminary analysis compared the use of SCP among BUILD and non-BUILD faculty. Overall, we found no difference between faculty participating and not participating in BUILD with both groups at the national mean of 50 (see Figure 1). We did not anticipate finding any significant differences between BUILD and non-BUILD faculty^a, as BUILD activities for faculty were still under development, at the beginning of their implementation, and/or just ramping up at this early stage of the program. We then compared the use of SCP among the BUILD (and non-BUILD) faculty by several demographic (underrepresented racial/ethnic groups versus well-represented groups, gender), and professional variables (e.g., faculty rank, discipline) that the research literature shows are associated with teaching pedagogy. With later longitudinal data, we will be able to assess changes in the use of SCP over time, and identify the impact of BUILD on the use of these practices.

Variations by Demographic and Professional Characteristics in the Use of Student-Centered Pedagogy among Faculty

To determine if the lack of difference between BUILD and non-BUILD faculty is related to different characteristics of those two groups, we examined a number of variables where SCP would be expected to vary, starting with faculty from underrepresented racial/ethnic groups^b versus well-

represented groups. The data in Table 1 show that, among BUILD-affiliated faculty, the mean SCP score is higher for faculty from underrepresented groups than White and Asian faculty, indicating that underrepresented faculty report the use of SCP in more of their courses than White or Asian faculty. There is no difference between BUILD and non-BUILD faculty among URM or White/Asian groups. Since the difference is only among BUILD faculty, this could be a selection effect if BUILD sites attract URM who already use more SCP strategies.

Regardless of BUILD participation, female faculty have higher mean SCP scores than male faculty, indicating that they utilize SCP in more of their courses than their male colleagues. Similar to the findings by race/ethnicity, we do not find significant differences in faculty use of SCP by BUILD participation. (Table 2). When disaggregating the data by BUILD participation and general disciplinary affiliation, we find no significant differences by BUILD versus non-BUILD participation. Faculty differ significantly in their use of SCP by broad disciplinary affiliation^c

^a In these analyses, BUILD involvement means that a faculty member was listed as a registered participant in any BUILD activity; all others are non-BUILD faculty.

^b Blacks or African Americans, Hispanics or Latinos, American Indians or Alaska Natives, Native Hawaiians and other Pacific Islanders. See Notice of NIH's Interest in Diversity, NOT-OD-20-031, November 22, 2019.

^c The DPC identified a set of biomedical majors that reflects the targeted disciplines of the BUILD sites, which is somewhat broader than the NSF-NIH list used in their surveys of graduate and postdoctoral students. See https://www.diversityprogram-consortium.org/files/view/docs/NEW-BioMed_Majors.pdf.

Table 1. Faculty Use of Student-Centered Pedagogy (scale) by BUILD involvement and URM status (N=647)

Characteristic	BUILD		Non-BUILD	
	mean (N)	SD	mean (N)	SD
URM	51.7 (82) ^A	8.4	50.8 (79) ^{AB}	8.8
White/ Asian	49.2 (225) ^B	7.9	49.9 (261) ^{AB}	9.0

Means with the same letter (A, B) are not significantly different using Duncan's multiple range test at $p < 0.05$

Table 2. Faculty Use of Student-Centered Pedagogy (scale) by BUILD involvement and gender (N=764)

Characteristic	BUILD		Non-BUILD	
	mean (N)	SD	mean (N)	SD
Female	51.0 (205) ^A	8.0	52.4 (215) ^A	8.4
Male	48.8 (150) ^B	8.5	47.1 (194) ^A	9.3

Means with the same letter (A, B) are not significantly different using Duncan's multiple range test at $p < 0.05$

Table 3. Faculty Use of Student-Centered Pedagogy (scale) by BUILD involvement and discipline (N=643)

Characteristic	BUILD		Non-BUILD	
	mean (N)	SD	mean (N)	SD
Biomed – Natural Sciences and Engineering (NSE)	48.6 (197) ^C	8.4	48.9 (196) ^C	8.4
Biomed – Behavioral and Social Sciences (BSS)	50.0 (55) ^C	7.0	50.6 (58) ^{BC}	8.8
Non-Biomed	53.4 (53) ^A	6.9	52.9 (84) ^{AB}	8.8

Means with the same letter (A, B, C) are not significantly different using Duncan's multiple range test at $p < 0.05$

(Table 3). Specifically, faculty in the natural sciences have a significantly lower mean SCP score than other groups, indicating that they utilize SCP in fewer courses than their non-biomedical colleagues, whether or not they are BUILD faculty. Among both BUILD and non-BUILD biomedical faculty there are no significant differences between those in the social sciences and natural sciences, in use of SCP. This suggests a disciplinary effect on the use of SCP at baseline. There are no significant differences in SCP by academic rank between

BUILD and non-BUILD faculty, except among lecturers or instructors, where BUILD faculty have a higher mean SCP score (Table 5). Across academic ranks, BUILD lecturers engage in SCP in more courses than associate or full professors. Among non-BUILD faculty, there is no difference by rank.

The HERI Faculty Survey included a question asking whether faculty had participated in any professional development workshops on enhancing

Table 4. Faculty Use of Student-Centered Pedagogy (scale) by BUILD involvement and rank (N=765)

Characteristic	BUILD		Non-BUILD	
	mean (N)	SD	mean (N)	SD
Professor	47.9 (73) ^C	7.5	48.3 (161) ^{B^C}	9.1
Associate Professor	49.4 (115) ^{BC}	7.4	50.2 (88) ^{ABC}	8.6
Assistant Professor	50.8 (120) ^{ABC}	8.7	52.0 (107) ^{AB}	8.6
Lecturer or Instructor	53.1 (47) ^A	9.4	50.0 (54) ^{BC}	10.6

Means with the same letter (A, B, C) are not significantly different using Duncan's multiple range test at $p < 0.05$

Table 5. Faculty Use of Student-Centered Pedagogy (scale) by BUILD involvement and receipt of pedagogical training (N=754)

Characteristic	BUILD		Non-BUILD	
	mean (N)	SD	mean (N)	SD
Reported training — Yes	50.4 (260) ^{AB}	7.7	52.0 (262) ^A	8.2
Reported training — No	48.8 (89) ^B	9.5	45.9 (143) ^C	9.6

Means with the same letter (A, B, C) are not significantly different using Duncan's multiple range test at $p < 0.05$

pedagogy or student learning in the past three years. There is no statistically significant difference among those who reported training or not, for faculty who had participated in BUILD-related activities. Among faculty who reported that they had not received any training, BUILD faculty have a higher mean SCP score than non-BUILD faculty. This could indicate a selection effect for those engaged in any BUILD training, meaning that those interested in the quality of their teaching may be more attracted to BUILD activities.

Conclusion

This cross-sectional data identifies variation among biomedical faculty in their use of SCP by common demographic and professional characteristics. The results suggest that the frequency with which faculty reported incorporating evidenced-based, student-centered teaching practices into their courses did not differ significantly whether or not they had participated in BUILD-related activities. This finding is expected, as most if not all of the sites had yet to fully establish the faculty development aspects of their BUILD projects leading up to when the baseline HERI Faculty Survey was administered. Our findings support

other research that notes differences in SCP across individual demographic and professional characteristics.⁸ These data will allow us to assess the impact of BUILD-related activities on the use SCP through time as sites developed and implemented the faculty development components of their grants, which include aspects related to enhancing teaching as well as expanding faculty's capacity to engage in research. The current differences by demographic and professional characteristics shows both that the SCP construct is sensitive to variation and that it will be important in multivariable analyses in the future to control for these characteristics.

Future analyses will also further refine faculty categories to include those more heavily involved with BUILD activities related to teaching versus research, rather than the category shown here which includes any type of BUILD involvement.

Data

The 2016 HERI Faculty Survey used in this report includes 765 respondents from the 10 BUILD grantees. HERI produces nationally normed data from over 20,000 full-time undergraduate teaching

faculty. The individual responses on each student-centered pedagogy item were scored using Item Response Theory (IRT) to create a single score which was normalized using all institutions in the HERI survey to have a mean of 50 and a standard deviation of 10.7

About BUILD

Building Infrastructure Leading to Diversity (BUILD) consists of a set of 10 linked awards granted to primarily undergraduate institutions, each of which developed approaches intended to determine the most effective ways to engage and retain students from diverse backgrounds in biomedical research, and to prepare students to become future contributors to the NIH-funded research enterprise.

BUILD is one of three initiatives within the Diversity Program Consortium (DPC). Further information can be found here: <https://www.diversityprogramconsortium.org/pages/nih>

Publication and Contact Information

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