Supplemental Material

CBE—Life Sciences Education

Connolly *et al.*

APPENDIX A
Variable Descriptions

Variables	Description

College Teaching Self-Efficacy	Perceived college teaching self-efficacy, which measures respondents' self-reported confidence with college teaching. Following seven factors are measured and each factor includes five items. A five-point Likert-type scale was employed for each item (1. Not at all confident, 2. Slightly confident, 3. Somewhat confident, 4. Very confident, 5. Extremely confident). These measures are from Y3 (2011) survey. *Italic items* were dropped through EFA.Raw scores range from 1 to 5. Averaged and standardized scores for seven factors were used in the analysis (Mean = 0; *SD* = 1).
1. Course planning	Five items include confidence in q1) setting learning goals, q2) selecting reading materials, q3) designing assignments, q4) planning class activities, and *q5) determining grading criteria*; Cronbach α = 0.906; Averaged raw score: *N*=1,419; Mean = 3.31; *SD* = 0.92
2. Teaching methods	Five items include confidence in q6) using various teaching strategies, *q7) clearly communicating expectations to students*, q8) engaging students in learning, q9) providing students opportunities to practice skills, and q10) promoting student collaboration; Cronbach α = 0.904; Averaged raw score: *N*=1,420; Mean = 3.28; *SD* = 0.91
3. Creating learning environment	Five items include confidence in q11) encouraging students to ask questions, q12) encouraging students to express ideas, q13) encouraging participation from women and minorities, *q14) encouraging students to respect one another,* and *q15) managing student-instructor disagreements;* Cronbach α = 0.910; Averaged raw score: *N* = 1,418; Mean = 3.49; *SD* = 0.93
4. Assessing student learning	Five items include confidence in *q16) developing assessments consistent with learning goals,* q17) accurately assessing students' knowledge, q18) grading assignments using criteria, q19) providing students constructive suggestions, and q20) providing students prompt feedback; Cronbach α = 0.878; Averaged raw score: *N* = 1,409; Mean = 3.47; *SD* = 0.79
5. Interacting with students	Five items include confidence in q21) fostering students' independent thinking, q22) addressing sensitive issues in ways that help students to deal with them maturely, q23) fostering students' confidence in ability to learn, *q24) working with problem students outside classroom,* and *q25) recognizing students who are not achieving to their fullest potential*; Cronbach α = 0.876; Averaged raw score: *N* = 1,409; Mean = 3.20; *SD* = 0.86
6. Mastering subject knowledge	Five items include confidence in q26) providing students an overview of discipline, q27) demonstrating passion for the material you are teaching, q28) staying current in subject knowledge, q29) helping students understand the relevance of learning, and q30) enriching teaching with research; Cronbach α = 0.875; Averaged raw score: *N* = 1,398; Mean = 3.82; *SD* = 0.75
TD Participation	Teaching Development (TD, *N* = 1,436) refers to various types of activities to enhance pedagogical knowledge for doctoral students through seminars, courses, workshops, symposiums, and discussion groups. TD participation was measured as Yes (*N* = 1,157, 80.58%) and No (*N* = 279, 19.42%). While the TD program participation was asked for specific programs in Y1 survey, a Y3 survey question asked whether respondents participated in any TD program.
TD Engagement	The level of engagement in TD activities (*N* = 1,058) was measured as cumulative hours spent on various TD activities during respondents' doctoral program. Range: 0–400 hours; Mean = 39.4 hours; *SD* = 50.1 hours. In the analyses, a continuous10-hourunit was used (= total TD hours/10).

TD Type	TD types (*N* = 1,353) were measured as non-intensive, intensive, and formal courses. *Non-intensive*participation (*N* = 368, 27.2%) involves TD offerings that typically are less interactive for participants, such as one-off talks, presentations, and other activities lasting less than a day. *Intensive* participation (*N* = 248, 18.33%) involves TD offerings that typically are more interactive, such as trainings, workshops, and conferences. *Formal courses*(*N* = 459, 33.92%) are a distinctive type of TD participation because courses typically are offered for academic credit, last an entire academic term, often are taught by a faculty member, and entail long-term interaction of instructor(s) and students. For our analysis, we defined both intensive participation and formal courses as including non-intensive participation because people who participated in the first two types almost always participated in the third.A reference group is non-participants (*N* = 278, 20.55%).
Amount of Teaching Experience	The amount of college teaching experience (*N* = 1,418) was measured as total numbers of semesters/quarters of diverse teaching-related activities (i.e., teaching assistant, lab assistant, guest lecturer, instructor, research mentor, and so on) that respondents experienced during their graduate education and/or postdoctoral training. The median was around 4.5 quarters or 3 semesters (Mean = 4.5 semesters or 6.7 quarters;*SD* = 4.1 semesters;range: 0–22 semesters). Quarter units were converted to semester units based on 1.5:1 quarter-semester ratio. Assuming the non-linear relationship between the amount of college teaching experience and self-efficacy measures, the square term of this measure was added in our analytic models.
Gender	Gender (*N* = 1,418) was measured as male (*N* = 757, 53.39%) or female (*N* = 661, 46.61%).
Race/ethnicity	Originally, race/ethnicity (*N* = 1,400) was measured as American Indian or Alaska native, Asian, Black or African American, Hispanic or Latino, more than one race or ethnicity, native Hawaiian or other pacific islander, and White. However, because of the low proportion of some minority groups, seven racial categories merged into three categories; White (*N* = 1,039, 74.21%), Asian (*N* = 253, 18.07%), and other minority (*N* = 108, 7.71%).
Citizenship	Citizenship status at the beginning of doctoral studies (*N* = 1,422) was measured as U.S. citizen, U.S. permanent resident, and other, and finally merged into U.S. citizen or permanent resident (*N* = 1,129, 79.4%) and other (*N* = 293, 20.6%).
Year Doctoral Studies Began	This variable measures a year that respondent began their doctoral studies (*N* = 1,420). 30.7 % of respondents began their doctoral studies between 2001 and 2003 year, and 64.44% began between 2004 and 2006 year (~ 2000: 1.13%; 2007~ 2008: 3.73%).
Primary Career Goal at Start of Doctoral Studies	Primary career goal at the beginning of doctoral program (*N* = 1,421) was measured as faculty career at a college or university, research career in government, industry or business, start your own business, undecided, and other goal. These categories were merged into faculty career (*N* = 374, 26.32%), research career (*N* = 758, 53.34%), and other (*N* = 289, 20.34%).
Interest in Teaching at Start of Doctoral Studies	Interest in teaching undergraduate students at start of doctoral studies (*N* = 1,431) was measured using a five-point Likert-type scale: 1. Not at all interested (*N* = 161, 11.25%), 2. Slightly interested (*N* = 330, 23.06%), 3. Somewhat interested (*N* = 441, 30.82%), 4. Very interested (*N* = 349, 24.39%), and 5. Extremely interested (*N* = 150, 10.48%). Mean = 3.00; *SD* = 1.16

Principal Field of Study	Principal fields of study (N = 1,425) were measured as 1) Engineering (N = 184, 12.91%), 2) Physical Sciences (N = 240, 16.84%), 3) Earth, Atmospheric, and Ocean Sciences (N = 62, 4.45%), 4) Mathematical Sciences (N = 77, 5.4%), 5) Computer Sciences (N = 51, 3.58%), 6) Agricultural Sciences (N = 18, 1.26%), 7) Biological Sciences (N = 416, 29.19%), 8) Psychology (N = 58, 4.07%), 9) Social Sciences (N = 189, 13.26%), 10) Health Fields (N = 69, 4.84%), and 11) Other (N = 61, 4.28%).
Institutions	Participants' doctorate-granting institutions (N = 1,445) included Arizona State University (N = 188, 13.01%), the University of Washington-Seattle (N = 704, 48.72%), and the University of Wisconsin-Madison (N = 553, 38.27%).
Interest in Becoming a Faculty Member	This variable refers to whether respondents considered applying for a faculty job in the future when they were late-stage doctoral students (N = 1,419). This variable was measured at Y1 (2009) as Yes (N = 812, 57.22%), No (N = 257, 18.11%), and Not Sure (N = 350, 24.67%).
TD Participation Is Required	This variable indicates whether or not respondents' TD participation is required by advisor, department, graduate school, and so on (N = 1,445). This was measured at Y1 survey as Yes (N = 788, 54.53%) and No (N = 657, 45.47%).
Completed Doctorate	This variable refers to respondents' current academic status at Y3 (2011) survey (N = 1,445). This was measured as 1) Currently enrolled in a Ph.D. program, 2) Graduated from a Ph.D. program with a Ph.D., and 3) Previously enrolled in a Ph.D. program but no longer pursuing a Ph.D. Our analysis included respondents currently enrolled in a Ph.D. program (N = 468, 32.39%) and graduated from a Ph.D. program (N = 977, 67.61%).

The Development and Validation of Survey Instruments on College Teaching Self-Efficacy

The construct validity of self-efficacy in college teaching was addressed by Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Our survey sample in this study was randomly split into halves. One sub-sample (n = 695)was used to identify the factor structure of self-efficacy in college teaching by means of EFA and this factor structure was tested in the second sub-sample(n = 696) by means of CFA. Both EFA and CFA were run using Mplus version 7.

The parallel analysis[1] was used to determine the number of factors to retain and it supported our 6-factor model (Hayton, Allen, & Scarpello, 2004; Brown, 2006; Henson & Roberts, 2006).The Kaiser-Guttman rule and the scree test based on the eigenvalues were also considered to determine the number of factors to retain (Brown, 2006; Henson & Roberts, 2006). While the Kaiser-Guttman rule (also referred to as "the eigenvalues > 1.0 rule") suggested a 4-factor model in this study, the scree test and parallel analysis supported a 6-factor model which was consistent with our theoretical model (see Figure 1). Further evidence based on the likelihood ratio test (LRT) and other fit-statistics such as SRMR, RMSEA, CFI, and TLI also supported a 6-factor model compared with 4 (or 5)-factor model.

[1] The parallel analysis was run using Stata version 14 with 100 replications.

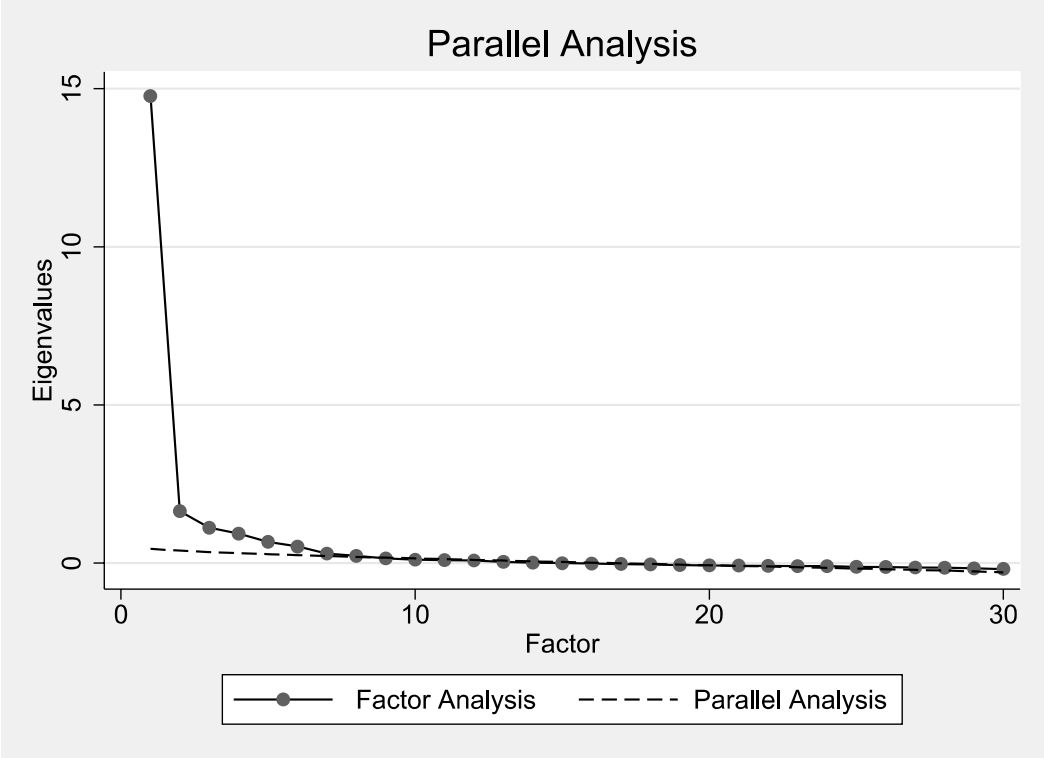

Figure 1. Parallel analysis to determine the number of factor

In both EFA and CFA, the maximum likelihood (ML) estimation was used. ML is the most commonly used estimation method in EFA and CFA with a key advantage that "allows for a statistical evaluation of how well the factor solution is able to reproduce the relationships among the indicators in the input data (Brown, 2006: 21)." However, the ML estimation requires the assumption of multivariate normality, which is controversial when using four or five-point Likert-type scales (Schmitt, 2011). Whereas this study used five-point Likert-type scales, the distribution of measured variables in this study did not severely violate the assumption of multivariate normality (e.g. the skewness was close to 0 and the kurtosis is less than 3; see Fabrigar et.al., 1999). For the robust analysis, this study also used the weighted least square mean-and-variance adjusted (WLSMV) estimation as an alternative for the ML estimation, which are usually used when data are ordinal. The results indicated that the ML estimation was

not substantially different from the WLSMV estimation in this study. Thus, this study used the ML estimation, assuming five-point Likert scales as continuous variables.

In EFA, we used the maximum likelihood factor analysis with an oblique rotation (GEOMIN rotation in Mplus; see Muthén & Muthén, 2012)to allow for correlations between all extracted factors. Items with factor loadings lower than 0.5 and items that loaded to a substantial degree on more than one factor were removed. EFA finally identified six factors in which six items were discarded (see table 1).A Cronbach's alpha coefficient of each factor ranged from 0.88 ~ 0.91, which indicated internal consistency reliability was acceptable (see table 2).

Table 1. Factor loadings and communalities based on a principal components analysis with oblique rotation for 30 items for college teaching self-efficacy scale (N= 695)

	F1	F2	F3	F4	F5	F6
q1) setting learning goals	0.61					
q2) selecting reading materials	0.65					
q3) designing assignments	0.86					
q4) planning class activities	0.73					
q5) determining grading criteria	*0.50*			*0.42*		
q6) using various teaching strategies		0.61				
q7) clearly communicating expectations to students		*0.48*				
q8) engaging students in learning		0.81				
q9) providing students opportunities to practice skills		0.65				
q10) promoting student collaboration		0.66				
q11) encouraging students to ask questions			0.94			
q12) encouraging students to express ideas			0.91			
q13) encouraging participation from women and minorities			0.77			
q14) encouraging students to respect one another			*0.51*			
q15) managing student-instructor disagreements						
q16) developing assessments consistent with learning goals				*0.47*		
q17) accurately assessing students' knowledge				0.55		
q18) grading assignments using criteria				0.81		
q19) providing students constructive suggestions				0.57		
q20) providing students prompt feedback				0.67		
q21) fostering students' independent thinking					0.67	
q22) addressing sensitive issues in ways that help students to deal with them maturely					0.78	

q23) fostering students' confidence in ability to learn	0.74		
q24) working with problem students outside classroom			
q25) recognizing students who are not achieving to their fullest potential	*0.44*		
q26) providing students an overview of discipline			0.65
q27) demonstrating passion for the material you are teaching			0.63
q28) staying current in subject knowledge			0.86
q29) helping students understand the relevance of learning			0.65
q30) enriching teaching with research			0.72

Note. Factor loadings < .4 were suppressed.Items with factor loadings lower than 0.5 and items that loaded to a substantial degree on more than one factor were removed (see *Italics*). Question 14 was finally removed after CFA. Six factors are course planning (F1), teaching methods (F2), creating learning environment (F3), assessing student learning (F4), interacting with students (F5), and mastering subject knowledge (F6).

Table 2. Descriptive statistics for the six college-teaching self-efficacy factors (N=695)

	No. of items	Mean	SD	Cronbach'sα
Course planning	4	3.31	0.92	0.91
Teaching methods	4	3.28	0.91	0.90
Creating learning environment	3	3.49	0.93	0.91
Assessing student learning	4	3.47	0.79	0.88
Interacting with students	3	3.20	0.86	0.88
Mastering subject knowledge	5	3.82	0.75	0.88

Afterward, CFA was run to assess model fit to the data by using the second sub-sample (N = 696). We specified no cross-loading items and allowed all factors were correlated.Based on model modification indices, we removed one item (q14) from our original model, which significantly improved model fit statistics (see table 3). These fit statistics for our final model (see model 2 in table 3), derived from the revised EFA results with 23 items, was tested and provided an acceptable fit to the data regarding several guidelines for CFA (see Brown, 2006; Kline, 2011).

Table 3. Goodness of fit indices for college teaching self-efficacy 6-factor model

	χ^2 (*df*)	RMSEA[1]	RMSEA CI_{90}[2]	CFI[3]	TLI[4]	SRMR[5]
Model 1: 6 factor model with q14	926.078 (237)	0.065	0.060 ~ 0.069	0.946	0.937	0.039
Model 2: 6 factor model without q14	718.099 (215)	0.058	0.053 ~ 0.063	0.958	0.95	0.035

Guideline for CFA[6]	<=0.06	<=0.08	>=0.95	>=0.95	<=0.08

Note. [1] RMSEA, root-mean-square error of approximation; [2] RMSEA CI_{90}, a 90% confidence interval of RMSEA; [3] CFI, comparative fit indices; [4] TLI, Tucker-Lewis index; [5] SRMR, standardized root mean square residual. [6] See Brown (2006) and Kline (2011).

Table 4 shows the maximum likelihood parameter estimates on unstandardized coefficients, standard errors (*SE*s), standard coefficients, and R-squares.

Table 4. Maximum likelihood parameter estimates on the 23-item final facto structure of college teaching self-efficacy (N=696)

Factor	Items	Unstandardized coefficient	*SE*	Standardized coefficient	R-square
F1	q1) setting learning goals	1.00	0.00	0.79	0.63
	q2) selecting reading materials	0.86	0.04	0.70	0.49
	q3) designing assignments	1.12	0.04	0.90	0.82
	q4) planning class activities	1.11	0.04	0.89	0.80
F2	q6) using various teaching strategies	1.00	0.00	0.78	0.61
	q8) engaging students in learning	1.03	0.04	0.86	0.74
	q9) providing students opportunities to practice skills	0.98	0.04	0.85	0.73
	q10) promoting student collaboration	1.03	0.05	0.81	0.66
F3	q11) encouraging students to ask questions	1.00	0.00	0.91	0.83
	q12) encouraging students to express ideas	1.02	0.03	0.94	0.89
	q13) encouraging participation from women and minorities	0.90	0.03	0.77	0.60
F4	q17) accurately assessing students' knowledge	1.00	0.00	0.81	0.65
	q18) grading assignments using criteria	0.90	0.04	0.77	0.59
	q19) providing students constructive suggestions	1.06	0.05	0.83	0.69
	q20) providing students prompt feedback	0.98	0.04	0.79	0.63
F5	q21) fostering students' independent thinking	1.00	0.00	0.83	0.69
	q22) addressing sensitive issues in ways that help students to deal with them maturely	1.04	0.04	0.80	0.64
	q23) fostering students' confidence in ability to learn	1.03	0.04	0.85	0.72
F6	q26) providing students an overview of discipline	1.00	0.00	0.80	0.64
	q27) demonstrating passion for the material you are teaching	1.10	0.05	0.82	0.67
	q28) staying current in subject knowledge	0.93	0.04	0.77	0.59
	q29) helping students understand the relevance of learning	1.02	0.04	0.81	0.66
	q30) enriching teaching with research	0.95	0.06	0.64	0.41

Note. Six factors are course planning (F1), teaching methods (F2), creating learning environment (F3), assessing student learning (F4), interacting with students (F5), and mastering subject knowledge (F6).

In conclusion, our EFA and CFA results provide a support for the construct validity of college teaching self-efficacy instrument by confirming a six dimensional structure with 23 items.

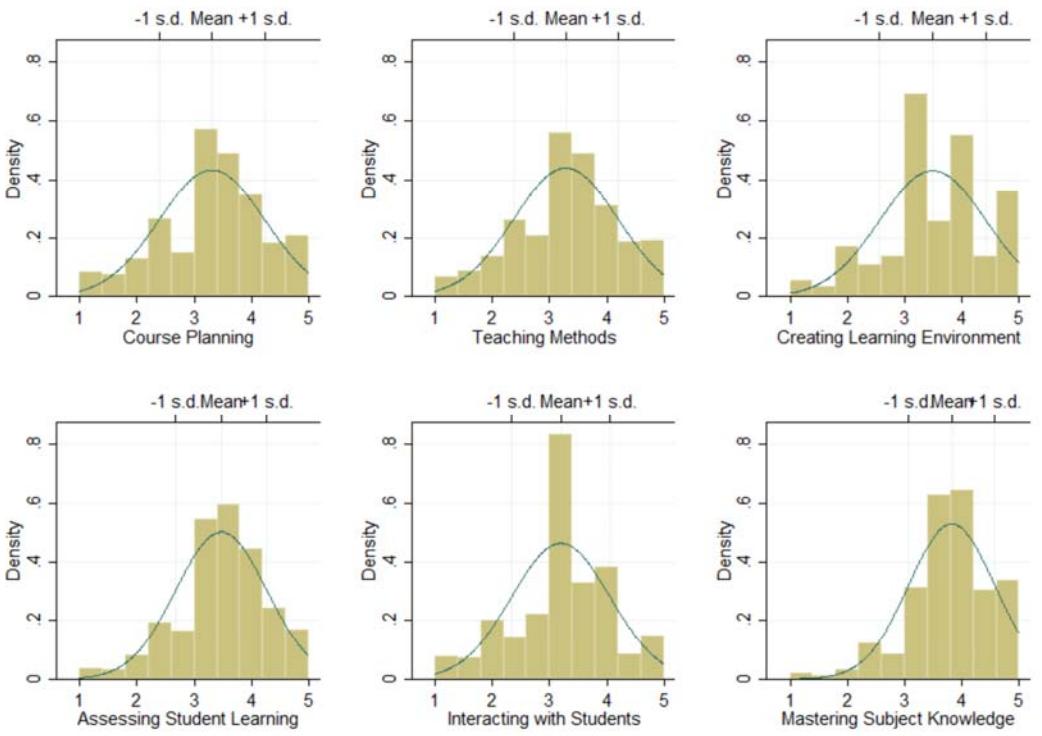

FIGURE S1. Histograms of each factor on College Teaching Self-efficacy. X axis refers to the score of Likert scales (1~5) for items used to measure each factor.

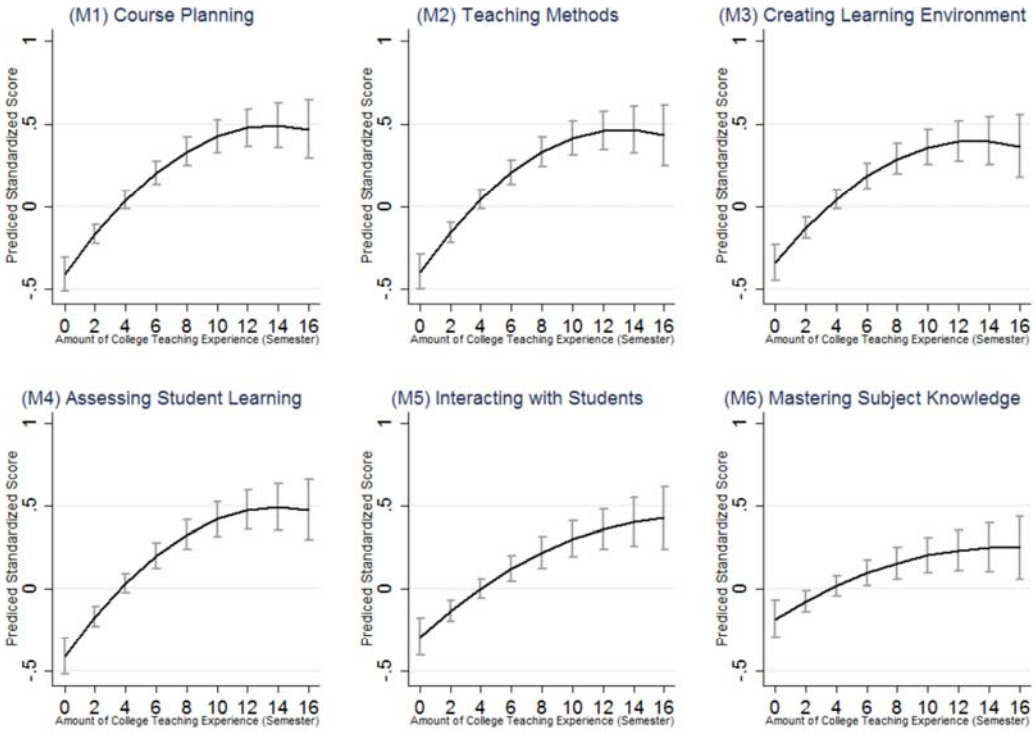

FIGURE S2. Predictive margins of each college teaching self-efficacy factor with 95% CI for amount of college teaching experience. Predicted scores were estimated from each analytic model presented in Table S1.

TABLE S1. OLS Regression of College Teaching Self-Efficacy on the TD Participation

	Course Planning (b/se)	Teaching Methods (b/se)	Creating Learning Environment (b/se)	Evaluating Student Learning (b/se)	Interacting with Students (b/se)	Mastering Subject Knowledge (b/se)
Variables	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
TD Participation	0.164*	0.231**	0.118	0.119	0.086	0.157
	(0.076)	(0.079)	(0.082)	(0.080)	(0.082)	(0.083)
Amount of Teaching Experience						
Semester	0.132***	0.130***	0.113***	0.129***	0.083***	0.058**
	(0.018)	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)
Semester squared	-0.005***	-0.005***	-0.004***	-0.005***	-0.002*	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.251***	-0.116*	0.002	-0.118*	-0.231***	-0.240***
	(0.051)	(0.052)	(0.055)	(0.053)	(0.055)	(0.055)
Race (ref: minority)						
White	-0.227*	-0.180	-0.283**	-0.092	-0.218*	-0.168
	(0.096)	(0.098)	(0.102)	(0.100)	(0.103)	(0.104)
Asian	-0.101	-0.035	-0.247*	-0.035	-0.137	-0.255*
	(0.110)	(0.113)	(0.118)	(0.116)	(0.119)	(0.120)
Citizenship	-0.076	0.059	0.011	0.021	-0.064	0.091
(ref: US Citizen and Permanent R.)	(0.080)	(0.082)	(0.085)	(0.084)	(0.086)	(0.087)
The Year of Beginning Doctoral Studies	0.023	0.022	-0.003	0.014	-0.002	0.031
	(0.017)	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)
Primary Career Goal, at the beginning (ref: others)						
Faculty Career	0.064	-0.054	-0.039	0.002	0.022	0.024
	(0.068)	(0.070)	(0.073)	(0.071)	(0.073)	(0.073)
Research Career	0.065	-0.072	-0.058	0.043	0.020	0.122
	(0.074)	(0.076)	(0.079)	(0.077)	(0.079)	(0.080)
Interest in Teaching, at the beginning	0.148***	0.180***	0.132***	0.144***	0.156***	0.115***
	(0.024)	(0.024)	(0.025)	(0.025)	(0.025)	(0.026)
Institution (ref: Institution 1)						
Institution 2	-0.183*	-0.185*	-0.045	-0.233**	-0.164	-0.092
	(0.080)	(0.082)	(0.085)	(0.083)	(0.085)	(0.086)
Institution 3	-0.183*	-0.207*	-0.171*	-0.223**	-0.197*	-0.172
	(0.081)	(0.084)	(0.087)	(0.085)	(0.087)	(0.088)

TABLE S1. Cont.

Variables	Course Planning (b/se) M1	Teaching Methods (b/se) M2	Creating Learning Environment (b/se) M3	Evaluating Student Learning (b/se) M4	Interacting with Students (b/se) M5	Mastering Subject Knowledge (b/se) M6
The Principal Field of Study (ref. Engineering)						
Physical Science	-0.237*	-0.206*	-0.184	-0.087	-0.026	-0.195
	(0.094)	(0.096)	(0.100)	(0.098)	(0.100)	(0.102)
Earth, Atmospheric, and Ocean Science	-0.048	-0.118	-0.091	-0.076	-0.100	-0.024
	(0.139)	(0.143)	(0.149)	(0.144)	(0.148)	(0.151)
Mathematical Science	-0.215	-0.321*	-0.365*	-0.160	-0.287*	-0.378**
	(0.132)	(0.136)	(0.142)	(0.138)	(0.142)	(0.143)
Computer Science	0.063	-0.071	-0.178	-0.055	-0.107	-0.061
	(0.145)	(0.150)	(0.156)	(0.152)	(0.156)	(0.157)
Agricultural Science	0.037	0.142	0.085	-0.118	0.253	-0.086
	(0.234)	(0.241)	(0.250)	(0.244)	(0.251)	(0.252)
Bio Science	-0.169	-0.079	-0.258**	-0.150	-0.025	-0.029
	(0.087)	(0.090)	(0.094)	(0.091)	(0.094)	(0.095)
Psychology	-0.040	-0.101	-0.042	-0.066	0.105	-0.024
	(0.146)	(0.150)	(0.157)	(0.153)	(0.157)	(0.159)
Social Science	0.031	-0.229*	-0.170	-0.182	-0.011	-0.144
	(0.105)	(0.108)	(0.113)	(0.110)	(0.113)	(0.114)
Health Fields	-0.248	-0.248	-0.166	-0.282*	0.017	-0.092
	(0.133)	(0.137)	(0.143)	(0.139)	(0.142)	(0.144)
Other	-0.015	-0.100	0.035	-0.232	0.017	0.026
	(0.139)	(0.142)	(0.149)	(0.146)	(0.150)	(0.153)
Potential STEM Faculty (ref. No)						
Yes	0.145*	0.165*	0.054	0.102	0.084	0.211**
	(0.064)	(0.066)	(0.069)	(0.067)	(0.069)	(0.070)
Not Sure	-0.228**	-0.197*	-0.072	-0.177*	-0.053	-0.221**
	(0.076)	(0.078)	(0.081)	(0.079)	(0.082)	(0.082)
TD Required	-0.054	-0.076	-0.099	-0.040	-0.021	-0.045
	(0.061)	(0.062)	(0.065)	(0.063)	(0.065)	(0.066)
Academic Status: Graduated	0.155**	0.122*	0.105	0.027	0.116	0.231***
(ref. Currently enrolled)	(0.056)	(0.057)	(0.060)	(0.058)	(0.060)	(0.060)
N	1346	1347	1345	1338	1338	1328
Adjusted R^2	0.226	0.187	0.104	0.157	0.117	0.098

* p< 0.05; ** p < 0.01; *** p < 0.001

TABLE S2. OLS Regression of College Teaching Self-Efficacy on the TD Engagement

Variables	Course Planning (b/se)	Teaching Methods (b/se)	Creating Learning Environment (b/se)	Evaluating Student Learning (b/se)	Interacting with Students (b/se)	Mastering Subject Knowledge (b/se)
	M1	M2	M3	M4	M5	M6
TD Engagement (10 hours)	0.032***	0.033***	0.013*	0.021***	0.013*	0.010
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Amount of Teaching Experience						
Semester	0.110***	0.116***	0.113***	0.113***	0.077***	0.056**
	(0.018)	(0.019)	(0.020)	(0.019)	(0.020)	(0.020)
Semester squared	-0.004***	-0.004***	-0.004***	-0.004***	-0.002*	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.259***	-0.119*	0.008	-0.120*	-0.227***	-0.235***
	(0.052)	(0.053)	(0.056)	(0.054)	(0.057)	(0.057)
Race (ref: minority)						
White	-0.216*	-0.174	-0.303**	-0.072	-0.215*	-0.171
	(0.098)	(0.100)	(0.105)	(0.103)	(0.107)	(0.107)
Asian	-0.108	-0.075	-0.295*	-0.013	-0.169	-0.273*
	(0.113)	(0.116)	(0.122)	(0.119)	(0.124)	(0.124)
Citizenship(ref: US Citizen and Permanent R.)	-0.083	0.041	-0.010	0.032	-0.067	0.087
	(0.081)	(0.083)	(0.087)	(0.085)	(0.089)	(0.089)
The Year of Beginning Doctoral Studies	0.030	0.029	-0.001	0.024	-0.001	0.028
	(0.017)	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)
Primary Career Goal, at the beginning (ref: others)						
Faculty Career	0.090	-0.024	-0.015	0.009	0.046	0.034
	(0.069)	(0.071)	(0.075)	(0.072)	(0.076)	(0.076)
Research Career	0.065	-0.064	-0.059	0.009	0.031	0.136
	(0.076)	(0.078)	(0.082)	(0.080)	(0.083)	(0.084)
Interest in Teaching, at the beginning	0.139***	0.168***	0.130***	0.129***	0.145***	0.110***
	(0.024)	(0.025)	(0.026)	(0.025)	(0.026)	(0.027)
Institution (ref: Institution 1)						
Institution 2	-0.189*	-0.181*	-0.064	-0.240**	-0.157	-0.124
	(0.081)	(0.084)	(0.088)	(0.085)	(0.089)	(0.089)
Institution 3	-0.188*	-0.178*	-0.176	-0.219*	-0.171	-0.188*
	(0.083)	(0.086)	(0.090)	(0.087)	(0.091)	(0.091)

TABLE S2. Cont.

Variables	Course Planning (b/se) M1	Teaching Methods (b/se) M2	Creating Learning Environment (b/se) M3	Evaluating Student Learning (b/se) M4	Interacting with Students (b/se) M5	Mastering Subject Knowledge (b/se) M6
The Principal Field of Study (ref. Engineering)						
Physical Science	-0.259**	-0.230*	-0.176	-0.084	-0.034	-0.184
	(0.096)	(0.099)	(0.104)	(0.100)	(0.105)	(0.105)
Earth, Atmospheric, and Ocean Science	-0.080	-0.125	-0.086	-0.072	-0.096	0.008
	(0.140)	(0.144)	(0.151)	(0.145)	(0.152)	(0.154)
Mathematical Science	-0.217	-0.294*	-0.338*	-0.102	-0.284	-0.330*
	(0.136)	(0.140)	(0.146)	(0.142)	(0.148)	(0.148)
Computer Science	0.028	-0.047	-0.151	-0.008	-0.067	-0.048
	(0.149)	(0.153)	(0.160)	(0.155)	(0.162)	(0.162)
Agricultural Science	-0.031	0.023	-0.059	-0.189	0.168	-0.106
	(0.247)	(0.254)	(0.266)	(0.258)	(0.269)	(0.269)
Bio Science	-0.178*	-0.072	-0.219*	-0.127	-0.021	0.030
	(0.090)	(0.092)	(0.097)	(0.094)	(0.098)	(0.099)
Psychology	-0.041	-0.109	-0.002	-0.060	0.119	0.004
	(0.147)	(0.151)	(0.159)	(0.154)	(0.161)	(0.161)
Social Science	0.043	-0.218	-0.152	-0.139	-0.001	-0.130
	(0.108)	(0.111)	(0.117)	(0.113)	(0.118)	(0.118)
Health Fields	-0.351*	-0.331*	-0.212	-0.340*	-0.083	-0.102
	(0.141)	(0.145)	(0.152)	(0.147)	(0.154)	(0.154)
Other	-0.019	-0.129	0.013	-0.239	0.049	0.102
	(0.144)	(0.147)	(0.155)	(0.151)	(0.158)	(0.160)
Potential STEM Faculty (ref. No)						
Yes	0.104	0.122	0.007	0.069	0.056	0.207**
	(0.066)	(0.068)	(0.072)	(0.069)	(0.073)	(0.073)
Not Sure	-0.212**	-0.190*	-0.076	-0.159	-0.072	-0.216*
	(0.078)	(0.080)	(0.084)	(0.081)	(0.085)	(0.085)
TD Required	-0.006	0.002	-0.047	-0.007	0.016	0.019
	(0.053)	(0.055)	(0.057)	(0.056)	(0.058)	(0.058)
Academic Status: Graduated	0.179**	0.143*	0.105	0.055	0.114	0.246***
(ref. Currently enrolled)	(0.056)	(0.058)	(0.061)	(0.059)	(0.062)	(0.062)
N	1261	1262	1260	1253	1253	1243
Adjusted R^2	0.241	0.201	0.105	0.158	0.110	0.095

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

TABLE S3. OLS Regression of College Teaching Self-Efficacy on the TD Type

	Course Planning (b/se)	Teaching Methods (b/se)	Creating Learning Environment (b/se)	Evaluating Student Learning (b/se)	Interacting with Students (b/se)	Mastering Subject Knowledge (b/se)
Variables	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
TD Type (ref. Non-participants)						
Non-Intensive	0.048	0.068	0.062	0.094	0.057	0.144
	(0.086)	(0.088)	(0.092)	(0.089)	(0.093)	(0.094)
Intensive & Others	0.116	0.248*	0.125	0.116	-0.006	0.189
	(0.098)	(0.101)	(0.105)	(0.102)	(0.107)	(0.107)
Formal Course & Others	0.317***	0.367***	0.099	0.182*	0.078	0.151
	(0.085)	(0.088)	(0.092)	(0.089)	(0.093)	(0.094)
Amount of Teaching Experience						
Semester	0.120***	0.124***	0.117***	0.120***	0.085***	0.058**
	(0.018)	(0.019)	(0.020)	(0.019)	(0.020)	(0.020)
Semester squared	-0.004***	-0.005***	-0.005***	-0.004***	-0.003*	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.260***	-0.128*	0.005	-0.120*	-0.227***	-0.235***
	(0.052)	(0.053)	(0.056)	(0.054)	(0.057)	(0.057)
Race (ref: minority)						
White	-0.217*	-0.179	-0.281**	-0.074	-0.202	-0.160
	(0.097)	(0.099)	(0.104)	(0.102)	(0.106)	(0.106)
Asian	-0.091	-0.054	-0.259*	-0.004	-0.145	-0.245*
	(0.112)	(0.115)	(0.120)	(0.118)	(0.123)	(0.123)
Citizenship (ref: US Citizen and Permanent R.)	-0.076	0.045	-0.015	0.031	-0.060	0.085
	(0.081)	(0.083)	(0.087)	(0.085)	(0.089)	(0.089)
The Year of Beginning Doctoral Studies	0.026	0.024	-0.006	0.018	-0.005	0.026
	(0.017)	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)
Primary Career Goal, at the beginning (ref: others)						
Faculty Career	0.065	-0.050	-0.027	-0.007	0.035	0.014
	(0.069)	(0.071)	(0.074)	(0.072)	(0.075)	(0.076)
Research Career	0.070	-0.059	-0.057	0.022	0.031	0.121
	(0.076)	(0.078)	(0.082)	(0.079)	(0.083)	(0.083)
Interest in Teaching, at the beginning	0.146***	0.175***	0.136***	0.134***	0.151***	0.111***
	(0.024)	(0.025)	(0.026)	(0.025)	(0.026)	(0.027)
Institution (ref: Institution 1)						
Institution 2	-0.216**	-0.216**	-0.068	-0.247**	-0.163	-0.123
	(0.082)	(0.084)	(0.088)	(0.085)	(0.089)	(0.089)
Institution 3	-0.185*	-0.190*	-0.177*	-0.219*	-0.169	-0.180*
	(0.083)	(0.085)	(0.089)	(0.087)	(0.090)	(0.091)

TABLE S3. Cont.

Variables	Course Planning (b/se) M1	Teaching Methods (b/se) M2	Creating Learning Environment (b/se) M3	Evaluating Student Learning (b/se) M4	Interacting with Students (b/se) M5	Mastering Subject Knowledge (b/se) M6
The Principal Field of Study (ref. Engineering)						
Physical Science	-0.269**	-0.241*	-0.184	-0.094	-0.040	-0.191
	(0.097)	(0.099)	(0.104)	(0.101)	(0.105)	(0.106)
Earth, Atmospheric, and Ocean Science	-0.095	-0.148	-0.096	-0.080	-0.098	0.002
	(0.141)	(0.144)	(0.151)	(0.145)	(0.152)	(0.154)
Mathematical Science	-0.246	-0.331*	-0.376**	-0.145	-0.312*	-0.363*
	(0.135)	(0.139)	(0.145)	(0.141)	(0.147)	(0.147)
Computer Science	-0.027	-0.106	-0.160	-0.049	-0.093	-0.061
	(0.149)	(0.153)	(0.160)	(0.155)	(0.162)	(0.163)
Agricultural Science	-0.055	0.015	-0.001	-0.144	0.224	-0.044
	(0.240)	(0.247)	(0.258)	(0.250)	(0.261)	(0.262)
Bio Science	-0.172	-0.056	-0.221*	-0.128	-0.027	0.029
	(0.091)	(0.093)	(0.097)	(0.095)	(0.099)	(0.099)
Psychology	-0.070	-0.130	-0.014	-0.084	0.099	-0.007
	(0.147)	(0.151)	(0.158)	(0.154)	(0.161)	(0.162)
Social Science	-0.007	-0.243*	-0.170	-0.172	-0.036	-0.121
	(0.109)	(0.112)	(0.117)	(0.113)	(0.118)	(0.119)
Health Fields	-0.364**	-0.332*	-0.204	-0.360*	-0.077	-0.077
	(0.141)	(0.145)	(0.151)	(0.147)	(0.153)	(0.154)
Other	-0.031	-0.125	0.017	-0.245	0.043	0.084
	(0.144)	(0.146)	(0.154)	(0.150)	(0.157)	(0.159)
Potential STEM Faculty (ref. No)						
Yes	0.122	0.138*	0.022	0.097	0.070	0.208**
	(0.066)	(0.068)	(0.071)	(0.069)	(0.072)	(0.073)
Not Sure	-0.205**	-0.183*	-0.071	-0.155	-0.072	-0.230**
	(0.078)	(0.080)	(0.084)	(0.081)	(0.085)	(0.086)
TD Required	-0.038	-0.059	-0.070	-0.035	0.022	-0.033
	(0.064)	(0.066)	(0.069)	(0.067)	(0.070)	(0.070)
Academic Status: Graduated	0.160**	0.127*	0.100	0.045	0.109	0.234***
(ref. Currently enrolled)	(0.056)	(0.058)	(0.060)	(0.059)	(0.061)	(0.062)
N	1273	1274	1272	1265	1265	1256
Adjusted R^2	0.234	0.197	0.103	0.152	0.109	0.093

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

TABLE S4. OLS Regression of College Teaching Self-Efficacy on the TD Program Engagement and Type

Variables	Course Planning (b/se) M1	Teaching Methods (b/se) M2	Creating Learning Environment (b/se) M3	Evaluating Student Learning (b/se) M4	Interacting with Students (b/se) M5	Mastering Subject Knowledge (b/se) M6
TD Engagement (10 hours)	0.027***	0.026***	0.016*	0.024***	0.018*	0.010
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
TD Type (ref. Non-participants)						
Non-Intensive	-0.010	0.014	0.032	0.049	0.024	0.132
	(0.087)	(0.089)	(0.094)	(0.091)	(0.095)	(0.095)
Intensive & Others	0.012	0.149	0.075	0.031	-0.070	0.162
	(0.101)	(0.104)	(0.110)	(0.106)	(0.111)	(0.112)
Formal Course & Others	0.077	0.139	-0.031	-0.026	-0.074	0.073
	(0.103)	(0.106)	(0.111)	(0.107)	(0.112)	(0.113)
Amount of Teaching Experience						
Semester	0.108***	0.113***	0.109***	0.110***	0.076***	0.053**
	(0.018)	(0.019)	(0.020)	(0.019)	(0.020)	(0.020)
Semester squared	-0.004***	-0.004***	-0.004***	-0.004***	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.267***	-0.130*	0.008	-0.120*	-0.224***	-0.237***
	(0.052)	(0.053)	(0.056)	(0.054)	(0.057)	(0.057)
Race (ref: minority)						
White	-0.217*	-0.176	-0.296**	-0.064	-0.207	-0.167
	(0.098)	(0.100)	(0.105)	(0.103)	(0.107)	(0.107)
Asian	-0.109	-0.075	-0.294*	-0.014	-0.170	-0.276*
	(0.113)	(0.116)	(0.122)	(0.119)	(0.124)	(0.124)
Citizenship (ref: US Citizen and Permanent R.)	-0.079	0.039	-0.014	0.030	-0.065	0.076
	(0.081)	(0.083)	(0.087)	(0.085)	(0.089)	(0.089)
The Year of Beginning Doctoral Studies	0.028	0.027	-0.004	0.021	-0.003	0.027
	(0.018)	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)
Primary Career Goal, at the beginning (ref: others)						
Faculty Career	0.090	-0.027	-0.013	0.013	0.051	0.035
	(0.069)	(0.071)	(0.075)	(0.072)	(0.076)	(0.076)
Research Career	0.072	-0.057	-0.057	0.012	0.033	0.134
	(0.076)	(0.078)	(0.082)	(0.080)	(0.083)	(0.084)
Interest in Teaching, at the beginning	0.138***	0.168***	0.131***	0.128***	0.144***	0.109***
	(0.024)	(0.025)	(0.026)	(0.025)	(0.027)	(0.027)
Institution (ref: Institution 1)						
Institution 2	-0.195*	-0.193*	-0.056	-0.227**	-0.140	-0.113
	(0.082)	(0.084)	(0.088)	(0.085)	(0.089)	(0.090)
Institution 3	-0.190*	-0.189*	-0.181*	-0.218*	-0.165	-0.188*
	(0.084)	(0.086)	(0.090)	(0.087)	(0.091)	(0.091)

TABLE S4. Cont.

Variables	Course Planning (b/se) M1	Teaching Methods (b/se) M2	Creating Learning Environment (b/se) M3	Evaluating Student Learning (b/se) M4	Interacting with Students (b/se) M5	Mastering Subject Knowledge (b/se) M6
The Principal Field of Study (ref. Engineering)						
Physical Science	-0.273**	-0.249*	-0.193	-0.103	-0.046	-0.193
	(0.096)	(0.099)	(0.104)	(0.101)	(0.105)	(0.106)
Earth, Atmospheric, and Ocean Science	-0.097	-0.150	-0.102	-0.087	-0.103	-0.003
	(0.140)	(0.144)	(0.151)	(0.145)	(0.152)	(0.154)
Mathematical Science	-0.227	-0.312*	-0.358*	-0.120	-0.293*	-0.340*
	(0.136)	(0.140)	(0.146)	(0.142)	(0.148)	(0.148)
Computer Science	-0.006	-0.084	-0.153	-0.016	-0.070	-0.051
	(0.150)	(0.154)	(0.162)	(0.156)	(0.164)	(0.164)
Agricultural Science	-0.057	-0.009	-0.061	-0.196	0.169	-0.117
	(0.247)	(0.254)	(0.267)	(0.258)	(0.270)	(0.270)
Bio Science	-0.189*	-0.073	-0.231*	-0.148	-0.044	0.023
	(0.091)	(0.093)	(0.098)	(0.095)	(0.099)	(0.099)
Psychology	-0.052	-0.116	-0.010	-0.074	0.104	0.000
	(0.147)	(0.151)	(0.159)	(0.154)	(0.161)	(0.162)
Social Science	0.023	-0.219	-0.147	-0.148	-0.020	-0.119
	(0.109)	(0.112)	(0.118)	(0.114)	(0.119)	(0.120)
Health Fields	-0.366**	-0.345*	-0.222	-0.355*	-0.096	-0.111
	(0.141)	(0.145)	(0.153)	(0.147)	(0.154)	(0.155)
Other	-0.037	-0.137	0.009	-0.249	0.034	0.111
	(0.144)	(0.147)	(0.155)	(0.151)	(0.158)	(0.160)
Potential STEM Faculty (ref. No)						
Yes	0.104	0.118	0.007	0.070	0.061	0.202**
	(0.066)	(0.068)	(0.071)	(0.069)	(0.073)	(0.073)
Not Sure	-0.201**	-0.180*	-0.072	-0.155	-0.069	-0.225**
	(0.078)	(0.080)	(0.084)	(0.081)	(0.085)	(0.085)
TD Required	-0.007	-0.034	-0.060	-0.015	0.034	-0.039
	(0.065)	(0.067)	(0.070)	(0.068)	(0.071)	(0.071)
Academic Status: Graduated	0.176**	0.138*	0.107	0.056	0.117	0.245***
(ref. Currently enrolled)	(0.056)	(0.058)	(0.061)	(0.059)	(0.062)	(0.062)
N	1260	1261	1259	1252	1252	1243
Adjusted R^2	0.239	0.201	0.104	0.155	0.108	0.095

* p< 0.05; ** p < 0.01; *** p < 0.001

TABLE S5. OLS Regression of College Teaching Self-Efficacy on the Interaction of Female and Race with TD Program Participation

Variables	Course Planning (b/se) M1	Teaching Methods (b/se) M2	Creating Learning Environment (b/se) M3	Evaluating Student Learning (b/se) M4	Interacting with Students (b/se) M5	Mastering Subject Knowledge (b/se) M6
TD Participation	-0.189	-0.045	0.058	-0.189	-0.297	-0.113
	(0.245)	(0.253)	(0.264)	(0.257)	(0.264)	(0.266)
Female	-0.564***	-0.372**	-0.108	-0.336**	-0.510***	-0.354**
	(0.118)	(0.121)	(0.127)	(0.123)	(0.127)	(0.129)
Race (ref: minority)						
White	-0.398	-0.305	-0.268	-0.279	-0.397	-0.351
	(0.227)	(0.234)	(0.244)	(0.237)	(0.243)	(0.245)
Asian	-0.230	-0.147	-0.323	-0.117	-0.475	-0.464
	(0.256)	(0.264)	(0.276)	(0.268)	(0.276)	(0.278)
Interaction of Female and race with TD Participation						
Female	0.381**	0.311*	0.131	0.265*	0.339*	0.139
	(0.128)	(0.132)	(0.138)	(0.134)	(0.138)	(0.140)
White	0.221	0.163	-0.013	0.237	0.229	0.225
	(0.245)	(0.253)	(0.264)	(0.257)	(0.264)	(0.267)
Asian	0.152	0.132	0.089	0.100	0.403	0.251
	(0.278)	(0.287)	(0.299)	(0.292)	(0.300)	(0.303)
Amount of Teaching Experience						
Semester	0.131***	0.130***	0.112***	0.129***	0.081***	0.057**
	(0.018)	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)
Semester squared	-0.005***	-0.005***	-0.004***	-0.005***	-0.002*	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Citizenship(ref: US Citizen and Permanent R.)	-0.083	0.052	0.004	0.018	-0.075	0.089
	(0.080)	(0.082)	(0.086)	(0.084)	(0.086)	(0.087)
The Year of Beginning Doctoral Studies	0.023	0.022	-0.003	0.013	-0.003	0.031
	(0.017)	(0.018)	(0.019)	(0.018)	(0.018)	(0.019)
Primary Career Goal, at the beginning (ref: others)						
Faculty Career	0.073	-0.047	-0.037	0.011	0.030	0.029
	(0.068)	(0.070)	(0.073)	(0.071)	(0.073)	(0.074)
Research Career	0.074	-0.065	-0.058	0.052	0.024	0.124
	(0.074)	(0.076)	(0.079)	(0.077)	(0.079)	(0.080)
Interest in Teaching, at the beginning	0.145***	0.177***	0.131***	0.141***	0.154***	0.113***
	(0.024)	(0.024)	(0.025)	(0.025)	(0.025)	(0.026)
Institution (ref: Institution 1)						
Institution 2	-0.193*	-0.192*	-0.047	-0.240**	-0.170*	-0.094
	(0.080)	(0.082)	(0.085)	(0.083)	(0.085)	(0.086)
Institution 3	-0.192*	-0.213*	-0.172*	-0.229**	-0.201*	-0.175*
	(0.081)	(0.083)	(0.087)	(0.085)	(0.087)	(0.088)

TABLE S5. Cont.

Variables	Course Planning (b/se) M1	Teaching Methods (b/se) M2	Creating Learning Environment (b/se) M3	Evaluating Student Learning (b/se) M4	Interacting with Students (b/se) M5	Mastering Subject Knowledge (b/se) M6
The Principal Field of Study (ref. Engineering)						
Physical Science	-0.223*	-0.195*	-0.181	-0.077	-0.018	-0.193
	(0.094)	(0.097)	(0.101)	(0.098)	(0.100)	(0.102)
Earth, Atmospheric, and Ocean Science	-0.029	-0.104	-0.089	-0.060	-0.090	-0.019
	(0.139)	(0.143)	(0.149)	(0.144)	(0.148)	(0.151)
Mathematical Science	-0.182	-0.296*	-0.359*	-0.133	-0.268	-0.368*
	(0.132)	(0.137)	(0.142)	(0.138)	(0.142)	(0.144)
Computer Science	0.081	-0.057	-0.176	-0.041	-0.101	-0.059
	(0.145)	(0.150)	(0.156)	(0.152)	(0.156)	(0.158)
Agricultural Science	0.047	0.148	0.082	-0.106	0.246	-0.088
	(0.233)	(0.241)	(0.251)	(0.244)	(0.250)	(0.253)
Bio Science	-0.155	-0.069	-0.256**	-0.138	-0.018	-0.025
	(0.087)	(0.090)	(0.094)	(0.091)	(0.094)	(0.095)
Psychology	-0.006	-0.075	-0.033	-0.041	0.122	-0.019
	(0.146)	(0.151)	(0.158)	(0.154)	(0.158)	(0.160)
Social Science	0.043	-0.220*	-0.167	-0.174	-0.007	-0.144
	(0.105)	(0.108)	(0.113)	(0.110)	(0.113)	(0.114)
Health Fields	-0.227	-0.231	-0.161	-0.266	0.029	-0.087
	(0.133)	(0.137)	(0.143)	(0.139)	(0.143)	(0.144)
Other	0.057	-0.045	0.049	-0.182	0.060	0.044
	(0.141)	(0.144)	(0.151)	(0.147)	(0.151)	(0.154)
Potential STEM Faculty (ref. No)						
Yes	0.142*	0.164*	0.058	0.098	0.088	0.210**
	(0.064)	(0.066)	(0.069)	(0.067)	(0.069)	(0.070)
Not Sure	-0.225**	-0.193*	-0.067	-0.176*	-0.047	-0.221**
	(0.076)	(0.078)	(0.082)	(0.080)	(0.082)	(0.083)
TD Required	-0.046	-0.070	-0.097	-0.034	-0.015	-0.042
	(0.060)	(0.062)	(0.065)	(0.063)	(0.065)	(0.066)
Academic Status: Graduated	0.148**	0.116*	0.104	0.020	0.112	0.228***
(ref. Currently enrolled)	(0.055)	(0.057)	(0.060)	(0.058)	(0.060)	(0.060)
N	1346	1347	1345	1338	1338	1328
Adjusted R^2	0.230	0.189	0.102	0.159	0.120	0.097

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

TABLE S6. OLS Regression ofCollege Teaching Self-Efficacy on the Interaction of Female and Race with TD Program Engagement

Variables	Course Planning (b/se) M1	Teaching Methods (b/se) M2	Creating Learning Environment (b/se) M3	Evaluating Student Learning (b/se) M4	Interacting with Students (b/se) M5	Mastering Subject Knowledge (b/se) M6
TD Engagement (10 hours)	0.001	0.020	0.009	0.007	-0.004	-0.000
	(0.020)	(0.021)	(0.022)	(0.021)	(0.022)	(0.022)
Female	-0.374***	-0.235***	-0.054	-0.199**	-0.253***	-0.295***
	(0.066)	(0.068)	(0.071)	(0.069)	(0.072)	(0.073)
Race (ref: minority)						
White	-0.262*	-0.148	-0.249	-0.069	-0.238	-0.149
	(0.123)	(0.127)	(0.133)	(0.130)	(0.136)	(0.136)
Asian	-0.196	-0.085	-0.365*	-0.056	-0.320*	-0.357*
	(0.142)	(0.146)	(0.154)	(0.150)	(0.157)	(0.157)
Interaction of Female and race with TD Participation						
Female	0.029**	0.029**	0.017	0.021	0.009	0.017
	(0.010)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
White	0.015	-0.004	-0.012	0.001	0.007	-0.004
	(0.020)	(0.020)	(0.021)	(0.020)	(0.021)	(0.021)
Asian	0.027	0.007	0.021	0.014	0.040	0.024
	(0.023)	(0.023)	(0.024)	(0.024)	(0.025)	(0.025)
Amount of Teaching Experience						
Semester	0.109***	0.117***	0.114***	0.113***	0.078***	0.057**
	(0.018)	(0.019)	(0.020)	(0.019)	(0.020)	(0.020)
Semester squared	-0.004***	-0.004***	-0.005***	-0.004***	-0.002*	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Citizenship	-0.087	0.036	-0.007	0.031	-0.061	0.089
(ref: US Citizen and Permanent R.)	(0.081)	(0.083)	(0.087)	(0.085)	(0.089)	(0.089)
The Year of Beginning Doctoral Studies	0.030	0.029	0.001	0.024	0.000	0.029
	(0.017)	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)
Primary Career Goal, at the beginning (ref: others)						
Faculty Career	0.097	-0.021	-0.011	0.012	0.052	0.037
	(0.069)	(0.071)	(0.075)	(0.073)	(0.076)	(0.076)
Research Career	0.068	-0.064	-0.063	0.009	0.029	0.133
	(0.076)	(0.078)	(0.082)	(0.080)	(0.083)	(0.084)
Interest in Teaching, at the beginning	0.138***	0.168***	0.130***	0.130***	0.144***	0.110***
	(0.024)	(0.025)	(0.026)	(0.025)	(0.026)	(0.027)
Institution (ref: Institution 1)						
Institution 2	-0.201*	-0.190*	-0.059	-0.245**	-0.152	-0.123
	(0.082)	(0.084)	(0.088)	(0.085)	(0.089)	(0.089)
Institution 3	-0.202*	-0.188*	-0.172	-0.225**	-0.167	-0.188*
	(0.083)	(0.086)	(0.090)	(0.087)	(0.091)	(0.091)

TABLE S6. Cont.

Variables	Course Planning (b/se) M1	Teaching Methods (b/se) M2	Creating Learning Environment (b/se) M3	Evaluating Student Learning (b/se) M4	Interacting with Students (b/se) M5	Mastering Subject Knowledge (b/se) M6
The Principal Field of Study (ref. Engineering)						
Physical Science	-0.251**	-0.222*	-0.189	-0.082	-0.050	-0.194
	(0.097)	(0.099)	(0.104)	(0.101)	(0.105)	(0.106)
Earth, Atmospheric, and Ocean Science	-0.063	-0.109	-0.084	-0.059	-0.097	0.014
	(0.140)	(0.144)	(0.151)	(0.145)	(0.152)	(0.154)
Mathematical Science	-0.206	-0.285*	-0.346*	-0.097	-0.292*	-0.334*
	(0.136)	(0.140)	(0.146)	(0.142)	(0.148)	(0.148)
Computer Science	0.040	-0.036	-0.156	-0.002	-0.075	-0.051
	(0.148)	(0.153)	(0.160)	(0.155)	(0.162)	(0.162)
Agricultural Science	-0.030	0.021	-0.070	-0.191	0.159	-0.115
	(0.246)	(0.253)	(0.266)	(0.257)	(0.269)	(0.269)
Bio Science	-0.179*	-0.073	-0.235*	-0.132	-0.039	0.016
	(0.090)	(0.092)	(0.097)	(0.094)	(0.098)	(0.099)
Psychology	-0.025	-0.099	-0.013	-0.055	0.111	-0.002
	(0.147)	(0.151)	(0.159)	(0.155)	(0.162)	(0.162)
Social Science	0.049	-0.214	-0.163	-0.138	-0.011	-0.138
	(0.108)	(0.111)	(0.117)	(0.113)	(0.118)	(0.119)
Health Fields	-0.338*	-0.321*	-0.229	-0.337*	-0.103	-0.115
	(0.141)	(0.145)	(0.153)	(0.148)	(0.154)	(0.155)
Other	0.002	-0.108	0.002	-0.230	0.029	0.094
	(0.144)	(0.147)	(0.156)	(0.151)	(0.158)	(0.160)
Potential STEM Faculty (ref. No)						
Yes	0.100	0.119	0.010	0.069	0.060	0.211**
	(0.066)	(0.068)	(0.071)	(0.069)	(0.073)	(0.073)
Not Sure	-0.211**	-0.188*	-0.074	-0.156	-0.069	-0.213*
	(0.077)	(0.080)	(0.084)	(0.081)	(0.085)	(0.085)
TD Required	0.003	0.010	-0.045	-0.001	0.016	0.022
	(0.053)	(0.055)	(0.058)	(0.056)	(0.058)	(0.059)
Academic Status: Graduated	0.168**	0.133*	0.101	0.048	0.113	0.241***
(ref. Currently enrolled)	(0.056)	(0.058)	(0.061)	(0.059)	(0.062)	(0.062)
N	1261	1262	1260	1253	1253	1243
Adjusted R^2	0.244	0.204	0.108	0.158	0.112	0.096

* p< 0.05; ** p < 0.01; *** p < 0.001

TABLE S7. OLS Regression of College Teaching Self-Efficacy on the Interaction of Female and Race with TD Type

Variables	Course Planning (b/se) M1	Teaching Methods (b/se) M2	Creating Learning Environment (b/se) M3	Evaluating Student Learning (b/se) M4	Interacting with Students (b/se) M5	Mastering Subject Knowledge (b/se) M6
TD Engagement (10 hours)	0.027***	0.026***	0.016*	0.024***	0.018*	0.010
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
TD Type (ref. Non-participants)						
Non-Intensive	-0.515	-0.490	-0.127	-0.398	-0.500	-0.183
	(0.273)	(0.281)	(0.296)	(0.287)	(0.299)	(0.301)
Intensive & Others	0.070	0.245	0.293	-0.094	-0.291	0.016
	(0.317)	(0.327)	(0.344)	(0.337)	(0.351)	(0.353)
Formal Course & Others	-0.407	-0.110	-0.129	-0.414	-0.487	-0.308
	(0.288)	(0.297)	(0.312)	(0.302)	(0.315)	(0.316)
Interaction of Female and race with TD type						
Female X Non-Intensive	0.400**	0.318*	0.147	0.283	0.515**	0.232
	(0.148)	(0.152)	(0.160)	(0.155)	(0.162)	(0.164)
Female X Intensive & Others	0.169	0.159	0.005	0.243	0.269	-0.096
	(0.164)	(0.169)	(0.178)	(0.172)	(0.180)	(0.181)
Female X Formal Course & Others	0.463**	0.353*	0.225	0.273	0.293	0.250
	(0.145)	(0.149)	(0.157)	(0.152)	(0.158)	(0.159)
White X Non-Intensive	0.416	0.444	0.132	0.406	0.350	0.243
	(0.277)	(0.285)	(0.300)	(0.291)	(0.304)	(0.305)
White X Intensive & Others	-0.148	-0.186	-0.266	0.042	0.110	0.179
	(0.312)	(0.322)	(0.339)	(0.332)	(0.346)	(0.347)
White X Formal Course & Others	0.299	0.122	-0.035	0.320	0.269	0.278
	(0.276)	(0.284)	(0.299)	(0.289)	(0.302)	(0.303)
Asian X Non-Intensive	0.180	0.284	0.044	0.171	0.297	0.191
	(0.314)	(0.323)	(0.340)	(0.331)	(0.345)	(0.346)
Asian X Intensive & Others	-0.076	-0.060	-0.075	-0.021	0.168	0.306
	(0.361)	(0.372)	(0.391)	(0.382)	(0.399)	(0.400)
Asian X Formal Course & Others	0.267	0.030	0.125	0.181	0.540	0.267
	(0.314)	(0.324)	(0.341)	(0.330)	(0.344)	(0.345)
Amount of Teaching Experience						
Semester	0.108***	0.110***	0.109***	0.109***	0.077***	0.054**
	(0.018)	(0.019)	(0.020)	(0.019)	(0.020)	(0.020)
Semester squared	-0.004***	-0.004***	-0.004***	-0.004***	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Citizenship	-0.065	0.048	-0.004	0.041	-0.058	0.072
(ref: US Citizen and Permanent R.)	(0.082)	(0.084)	(0.089)	(0.086)	(0.090)	(0.090)
The Year of Beginning Doctoral Studies	0.031	0.029	-0.001	0.022	-0.001	0.029
	(0.018)	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)

TABLE 7. Cont.

Variables	Course Planning (b/se) M1	Teaching Methods (b/se) M2	Creating Learning Environment (b/se) M3	Evaluating Student Learning (b/se) M4	Interacting with Students (b/se) M5	Mastering Subject Knowledge (b/se) M6
Primary Career Goal, at the beginning (ref: others)						
Faculty Career	0.105	-0.016	-0.009	0.026	0.058	0.040
	(0.069)	(0.071)	(0.075)	(0.073)	(0.076)	(0.076)
Research Career	0.084	-0.053	-0.054	0.023	0.033	0.138
	(0.076)	(0.078)	(0.083)	(0.080)	(0.083)	(0.084)
Interest in Teaching, at the beginning	0.132***	0.163***	0.129***	0.124***	0.139***	0.105***
	(0.024)	(0.025)	(0.026)	(0.025)	(0.027)	(0.027)
Institution (ref: Institution 1)						
Institution 2	-0.205*	-0.204*	-0.061	-0.235**	-0.142	-0.113
	(0.082)	(0.084)	(0.089)	(0.086)	(0.089)	(0.090)
Institution 3	-0.203*	-0.200*	-0.189*	-0.224*	-0.162	-0.195*
	(0.083)	(0.086)	(0.090)	(0.087)	(0.091)	(0.092)
The Principal Field of Study (ref. Engineering)						
Physical Science	-0.250*	-0.231*	-0.183	-0.093	-0.054	-0.175
	(0.097)	(0.100)	(0.105)	(0.101)	(0.106)	(0.107)
Earth, Atmospheric, and Ocean Science	-0.050	-0.112	-0.077	-0.062	-0.101	0.027
	(0.140)	(0.145)	(0.152)	(0.146)	(0.153)	(0.155)
Mathematical Science	-0.190	-0.280*	-0.350*	-0.090	-0.282	-0.322*
	(0.136)	(0.140)	(0.147)	(0.142)	(0.148)	(0.149)
Computer Science	0.034	-0.059	-0.134	0.001	-0.052	-0.022
	(0.150)	(0.155)	(0.163)	(0.157)	(0.164)	(0.165)
Agricultural Science	-0.042	-0.006	-0.067	-0.185	0.167	-0.115
	(0.247)	(0.255)	(0.268)	(0.259)	(0.270)	(0.271)
Bio Science	-0.174	-0.061	-0.230*	-0.138	-0.047	0.033
	(0.091)	(0.093)	(0.098)	(0.095)	(0.099)	(0.100)
Psychology	-0.019	-0.090	-0.000	-0.049	0.116	0.011
	(0.147)	(0.152)	(0.160)	(0.155)	(0.162)	(0.163)
Social Science	0.035	-0.211	-0.148	-0.141	-0.029	-0.115
	(0.109)	(0.113)	(0.119)	(0.115)	(0.120)	(0.121)
Health Fields	-0.334*	-0.323*	-0.214	-0.342*	-0.108	-0.080
	(0.142)	(0.146)	(0.154)	(0.149)	(0.155)	(0.156)
Other	0.060	-0.058	0.041	-0.189	0.071	0.154
	(0.146)	(0.149)	(0.158)	(0.153)	(0.160)	(0.163)

TABLE 7. Cont.

Variables	Course Planning (b/se) M1	Teaching Methods (b/se) M2	Creating Learning Environment (b/se) M3	Evaluating Student Learning (b/se) M4	Interacting with Students (b/se) M5	Mastering Subject Knowledge (b/se) M6
Potential STEM Faculty (ref. No)						
Yes	0.091	0.105	0.001	0.062	0.066	0.193**
	(0.066)	(0.068)	(0.072)	(0.070)	(0.073)	(0.073)
Not Sure	-0.214**	-0.190*	-0.079	-0.159	-0.071	-0.239**
	(0.078)	(0.080)	(0.085)	(0.082)	(0.085)	(0.086)
TD Required	0.000	-0.032	-0.061	-0.012	0.035	-0.033
	(0.065)	(0.067)	(0.070)	(0.068)	(0.071)	(0.071)
Academic Status: Graduated	0.169**	0.135*	0.107	0.049	0.114	0.241***
(ref. Currently enrolled)	(0.056)	(0.058)	(0.061)	(0.059)	(0.062)	(0.062)
N	1260	1261	1259	1252	1252	1243
Adjusted R^2	0.246	0.204	0.102	0.155	0.113	0.094

* p< 0.05; ** p < 0.01; *** p < 0.001

Longitudinal Study of Future STEM Faculty

Doctoral Student Professional Development Questionnaire

This questionnaire asks about your professional development during your doctoral education. We are particularly interested in the extent to which you participated in and benefited from teaching-focused professional development programs and activities. Your help with this study is important and greatly appreciated.

We also hope that you will benefit from taking this survey, as it provides an opportunity for you to reflect upon your doctoral education and the benefits of your professional development activities.

You do not need to write your name on this questionnaire. Please mark **(X)** and/or write your responses in black ink directly on the questionnaire. This questionnaire should take about 20 minutes to complete.

After completing the questionnaire, use the enclosed stamped envelope to mail it back to us as soon as possible. We expect to complete this survey by the end of July.

Thank you for your cooperation and participation!

Support for this work is provided by the National Science Foundation's Course, Curriculum, and Laboratory Improvement (CCLI) program under Award No. 0817537. Please visit http://lsff.wceruw.org/ for more information on this study.

1. Below is a list of teaching-focused professional development programs and activities at the University of Wisconsin–Madison. Please indicate which ones you have participated in during your doctoral education. *(Check all that apply, even those in which you only participated once)*

Academic Departments/Programs (e.g., Chemistry, Geography)

- ☐ Teaching-focused workshops
- ☐ Teaching-focused graduate courses

Center for Biology Education (CBE)

- ☐ Biology Instruction Brown Bag
- ☐ SyMBiosis Interdisciplinary Seminars

College of Letters and Science

- ☐ TA training workshops

Delta Program

- ☐ Graduate course(s) (e.g. Effective Teaching with Technology)
- ☐ Programs or seminars (e.g., Expeditions in Learning, Creating a Collaborative Learning Environment)
- ☐ Internship program
- ☐ Teaching certificate program
- ☐ Events (e.g., roundtable dinners, workshops)

Engineering Learning Center (ELC)

- ☐ New Educators' Orientation (NEO)
- ☐ Teaching Improvement Program (TIP)
- ☐ Science and Engineering Education Scholars Program (SEESP)

Graduate School

- ☐ Graduate student professional development workshops

Office of the Provost

- ☐ Annual Teaching and Learning Symposium

Teaching Academy

- ☐ Future Faculty Partners
- ☐ Scholarship of Teaching and Learning Discussion Series

Wisconsin Program for Scientific Teaching (WPST)

- ☐ Courses (e.g., Teaching Biology, Mentoring Seminar)
- ☐ HHMI Teaching Fellows Program

☐ Other *(please specify):* _____

If you did not check any of the responses above, please go directly to question 5.

2. For each of the following, please indicate approximately how many of that teaching-focused professional development activity you participated in during your doctoral education. For example, if you took two courses on teaching, you would write "2" next to "Formal courses on teaching." If you do not recall the exact number, provide your best estimate**.**

- ☐ Formal courses on teaching
- ☐ Short workshops or training on teaching (lasting one day or less)
- ☐ Intensive workshops or training on teaching (lasting more than one day)
- ☐ Short conferences/symposia on teaching (lasting one day or less)
- ☐ Intensive conferences/symposia on teaching (lasting more than one day)
- ☐ Talks/speeches/presentations on teaching
- ☐ Discussion sessions on teaching
- ☐ Teaching consultations (e.g., discussions with an instructor about TA work)
- ☐ Instructional technology consultations

3. Thinking about all of the teaching-focused professional development programs and activities you participated in during your doctoral education, how satisfied or dissatisfied were you with these programs and activities overall?

- ◯ Very dissatisfied
- ◯ Somewhat dissatisfied
- ◯ Neither satisfied nor dissatisfied
- ◯ Somewhat satisfied
- ◯ Very satisfied

4. Why did you decide to participate in these *teaching-focused* professional development programs or activities? *(Check all that apply)*

- ☐ Participation was required (e.g., by advisor, department, graduate school)
- ☐ To learn more about teaching and learning
- ☐ To improve my work as a teaching assistant
- ☐ To improve my knowledge and skills regarding teaching and learning
- ☐ To gain practical teaching experience
- ☐ To prepare for a career as a faculty member
- ☐ To obtain academic leadership and management skills
- ☐ To interact with people from different disciplines
- ☐ To be more competitive on the job market
- ☐ To improve my ability to explain my research to non-experts/laypersons
- ☐ To increase my chances of obtaining research grants
- ☐ To address a specific need *(please specify):* _____
- ☐ Other *(please specify):* _____

5. Which of the following factors, if any, have discouraged you from participating in teaching-focused professional development programs or activities? *(Check all that apply)*

- ☐ Not aware of programs or offerings
- ☐ Not enough time
- ☐ Not a high priority
- ☐ Little or no interest in teaching
- ☐ I was discouraged from participating (e.g., by my advisor, department)
- ☐ The programs/activities conflicted with my schedule
- ☐ I didn't find the programs/activities to be useful
- ☐ The people running the programs/activities were not helpful
- ☐ I didn't enjoy the experience
- ☐ I didn't feel like I fit in
- ☐ Other (*please specify):* _____

6. In what capacity and for how many semesters have you taught college or university classes? *(Check all that apply)*

- ☐ I have not yet taught college or university classes

- ☐ Grader for _____ semester(s)
- ☐ Teaching assistant for _____ semester(s)
- ☐ Lab assistant for _____ semester(s)
- ☐ Guest lecturer for _____ class session(s)
- ☐ Instructor for _____ semester(s)
- ☐ Other: _____ for _____ semester(s)

7. What is your principal field of study? *(Check the field that is closest to yours)*

- ◯ Engineering
- ◯ Physical Sciences (e.g., Astronomy, Chemistry, Physics)
- ◯ Earth, Atmospheric, and Ocean Sciences (e.g., Meteorology, Geosciences)
- ◯ Mathematical Sciences (e.g., Statistics)
- ◯ Computer Science (e.g., Information Sciences and Systems, Management Information Systems)
- ◯ Agricultural Sciences (e.g., Animal Sciences, Natural Resources Conservation)
- ◯ Biological Sciences (e.g., Botany, Ecology, Genetics, Nutrition, Zoology)
- ◯ Psychology
- ◯ Social Sciences (e.g., Agricultural Economics, Anthropology, Economics, Geography, History and Philosophy of Science, Linguistics, Political Science, Sociology)
- ◯ Health Fields (e.g., Nursing, Pharmaceutical Sciences, Veterinary Sciences)
- ◯ Other *(please specify):* _____

8. In what year did you begin your doctoral studies?

9. Have you successfully defended your dissertation proposal and become a Ph.D. candidate (dissertator)?

- ◯ Yes
- ◯ No

10. In what year do you expect to receive your Ph.D.?

11. During your time as a Ph.D. student, to what extent do you feel you have *gained or made progress* in the following areas?

	Not at all	Very little	Some	Very much
Teaching				
a. Ability to teach undergraduate courses	◯	◯	◯	◯
b. Ability to teach graduate courses	◯	◯	◯	◯
c. Interest in sharing teaching practices and experiences with colleagues	◯	◯	◯	◯
d. Appreciation of diversity in teaching and learning	◯	◯	◯	◯
Research				
a. Ability to conduct research	◯	◯	◯	◯
b. Ability to publish research findings	◯	◯	◯	◯
c. Ability to present research findings orally	◯	◯	◯	◯
d. Ability to obtain funding for research	◯	◯	◯	◯
e. Awareness of ethical issues related to conducting research	◯	◯	◯	◯
Career				
a. Preparation for a faculty career	◯	◯	◯	◯
b. Preparation for a non-academic career	◯	◯	◯	◯
c. Interest in becoming a faculty member	◯	◯	◯	◯
d. Interest in a non-academic career	◯	◯	◯	◯
e. Ability to make an informed decision about the type of career you will choose	◯	◯	◯	◯
f. Ability to balance teaching and research	◯	◯	◯	◯
g. Ability to build your professional network	◯	◯	◯	◯
h. Motivation for lifelong learning	◯	◯	◯	◯
Professional Skills				
a. Ability to prioritize tasks and manage your time	◯	◯	◯	◯
b. Ability to communicate effectively with others	◯	◯	◯	◯
c. Ability to collaborate with others	◯	◯	◯	◯
d. Ability to manage and supervise people	◯	◯	◯	◯

12. During your time as a Ph.D. student:

	A. How much have you *learned* about how to do each of the following?				B. How often have you *done* each of the following?		
Course Design	**None**	**Very little**	**Some**	**Very much**	**Never**	**Once**	**More than once**
a. Design a course	○	○	○	○	○	○	○
b. Create a syllabus	○	○	○	○	○	○	○
c. Set learning goals and objectives	○	○	○	○	○	○	○
d. Design lab exercises	○	○	○	○	○	○	○
e. Locate teaching resources	○	○	○	○	○	○	○
Classroom Teaching							
a. Lecture	○	○	○	○	○	○	○
b. Lead lab exercises	○	○	○	○	○	○	○
c. Facilitate classroom discussions	○	○	○	○	○	○	○
d. Encourage active learning	○	○	○	○	○	○	○
e. Encourage peer or cooperative learning	○	○	○	○	○	○	○
f. Encourage inquiry-based or problem-based learning	○	○	○	○	○	○	○
g. Use case studies in your teaching	○	○	○	○	○	○	○
h. Help students develop critical thinking skills	○	○	○	○	○	○	○
Assessment							
a. Assess student learning with exams	○	○	○	○	○	○	○
b. Assess student learning by means other than exams (e.g., papers, projects, lab assignments, problem sets)	○	○	○	○	○	○	○
c. Assess students' prior knowledge	○	○	○	○	○	○	○
d. Establish clear standards (e.g., rubrics) for assessment of student learning	○	○	○	○	○	○	○
e. Provide students with constructive feedback	○	○	○	○	○	○	○
Diversity in Learning							
a. Create an inclusive learning environment	○	○	○	○	○	○	○
b. Communicate with students from different cultures	○	○	○	○	○	○	○
c. Teach students of varying academic backgrounds	○	○	○	○	○	○	○
d. Teach students who have diverse learning styles	○	○	○	○	○	○	○
e. Draw on cultural diversity to enhance learning	○	○	○	○	○	○	○

During your time as a Ph.D. student *(continued from previous page)*:

Teacher-Student Relationships	A. How much have you *learned* about how to do each of the following? None	Very little	Some	Very much	B. How often have you *done* each of the following? Never	Once	More than once
a. Establish positive teacher-student relationships	○	○	○	○	○	○	○
b. Communicate high expectations to students	○	○	○	○	○	○	○
c. Advise students	○	○	○	○	○	○	○
d. Motivate students to learn	○	○	○	○	○	○	○
e. Handle difficult behavior in the classroom	○	○	○	○	○	○	○
f. Handle academic misconduct	○	○	○	○	○	○	○
Teaching in General							
a. Write a teaching philosophy	○	○	○	○	○	○	○
b. Assemble a teaching portfolio	○	○	○	○	○	○	○
c. Evaluate your own teaching	○	○	○	○	○	○	○
d. Use student feedback to improve your teaching	○	○	○	○	○	○	○
e. Use instructional technology	○	○	○	○	○	○	○
f. Co-teach a course with another instructor	○	○	○	○	○	○	○

13. Are you considering applying for a faculty job in the future?

- ○ Yes
- ○ No
- ○ Not sure

14. What was your citizenship status at the time you started your doctoral studies?

- ○ U.S. Citizen
- ○ U.S. Permanent Resident
- ○ Other

15. What is your race/ethnicity? *(Please check the category that best describes you)*

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African-American
- ☐ Hispanic or Latino
- ☐ More than one race or ethnicity
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White

16. What is your gender?

- ◯ Male
- ◯ Female

17. The goal of this study is to better understand the long-term impact of teaching-focused professional development on doctoral students. We will be conducting a second survey in Fall 2012, and we would like to invite you to participate. How may we get in touch with you a year from now to update your contact information? *(The following information will be kept separately from your responses to the questionnaire).*

Email: _____

Phone: ( ) _____

Mailing Address: _____

Street Address City State ZIP

Other *(please specify)*: _____

18. Do you have any other comments regarding your experiences with teaching-focused professional development?

Thank you for completing this survey. Your assistance is greatly appreciated! We look forward to your continued involvement in this longitudinal study.

Longitudinal Study of FUTURE STEM FACULTY

Dear Participant:

First, thank you again for being part of **the Longitudinal Study of Future STEM Faculty**. We greatly appreciate your involvement in Year Three of this important study.

Since we first contacted you two years ago, you and other study participants have faced important career-related decisions, such as what kind of job to take, where to live, how to balance work demands with personal priorities, or, in some cases, how (or whether) to complete your doctorate.

The College Teaching and Career Development Survey that you are about to take will help us to better understand these important choices and the many factors influencing them. **Completing this survey is crucial to the findings we make and their potential impact on policy and practice.**

This survey takes approximately **15 minutes** to complete. Please answer all questions. Your individual responses will remain confidential and will be reported only in aggregated form.

If you have any questions about this survey, please contact Dr. Mark Connolly, the study's principal investigator, at (608) 263-4233 or mrconnolly@wisc.edu.

Support for this work is provided by the National Science Foundation Transforming Undergraduate Education in Science, Technology, Engineering and Mathematics (TUES) program under Award No. 0817537. Please visit http://lsff.wceruw.org for more information on this study.

Please click 'NEXT' to advance to the next page of the survey.

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If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress

Longitudinal Study of FUTURE STEM FACULTY

Which of the following best describes your current academic status?

- ○ Currently enrolled in a Ph.D. program
- ○ Graduated from a Ph.D. program with a Ph.D.
- ○ Previously enrolled in a Ph.D. program but no longer pursuing a Ph.D.

During your graduate education and/or postdoctoral training, have you taught (or did you teach) undergraduate students as a teaching assistant, lab assistant, research mentor, guest lecturer, or instructor?

- ○ Yes
- ○ No

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If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress

Longitudinal Study of FUTURE STEM FACULTY

In what capacity have you taught (or did you teach) undergraduate students during your graduate education and/or postdoctoral training? *Please check all that apply.*

- [ ] As a teaching assistant
- [ ] As a lab assistant
- [ ] As a guest lecturer
- [ ] As an instructor
- [ ] As a research mentor for undergraduates
- [ ] Other *(please specify):* _____

For how many semesters/quarters have you been (or were you) involved in teaching college or university classes during your graduate education and/or postdoctoral training?

_____

- ○ Semesters
- ○ Quarters

To what extent did you expect to receive each of the following benefits by teaching undergraduate students during your graduate education and/or postdoctoral training?

	Not at all	Slightly	Somewhat	Very much	Extremely
Acquire some teaching experience	○	○	○	○	○
Fulfill program requirements	○	○	○	○	○
Enhance your ability to teach college students	○	○	○	○	○
Increase your confidence in your ability to teach college students	○	○	○	○	○
Receive financial support	○	○	○	○	○
Expand your professional network	○	○	○	○	○
Clarify your career interests	○	○	○	○	○
Clarify your career goals	○	○	○	○	○
Enhance your presentation skills	○	○	○	○	○

Prepare you for a faculty position	○	○	○	○	○
Increase your ability to find employment	○	○	○	○	○

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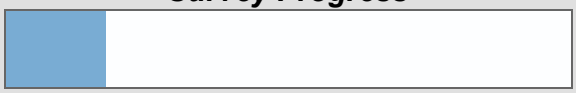
If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress



Longitudinal Study of FUTURE STEM FACULTY

As you may know, a number of universities have started providing doctoral students and postdoctoral trainees with opportunities to enhance their pedagogical knowledge and skills through teaching-focused professional development activities such as TA training, seminars, courses, workshops, symposiums, institutes, and discussion groups.

During your graduate education and/or postdoctoral training, have you participated (or did you participate) in any *teaching-focused professional development activities*?

- ○ Yes
- ○ No

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If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress

Longitudinal Study of FUTURE STEM FACULTY

Which of the following types of *teaching-focused professional development activities* have you participated (or did you participate) in during your graduate education and/or postdoctoral training? *Please check all that apply.*

- ☐ Formal courses
- ☐ Talks/speeches/presentations
- ☐ Short training/workshops/conferences/symposia (lasting one day or less)
- ☐ Intensive training/workshops/conferences/symposia (lasting more than one day)
- ☐ Other *(please specify):* _____

Approximately how many hours have you spent (or did you spend) on the above activities during your graduate education and/or postdoctoral training?

_____ **hours**

To what extent did you expect to receive each of the following benefits by participating in teaching-focused professional development activities during your graduate education and/or postdoctoral training?

	Not at all	Slightly	Somewhat	Very much	Extremely
Enhance your ability to teach college students	○	○	○	○	○
Increase your confidence in your ability to teach college students	○	○	○	○	○
Expand your professional network	○	○	○	○	○
Clarify your career interests	○	○	○	○	○
Clarify your career goals	○	○	○	○	○
Enhance your presentation skills	○	○	○	○	○
Prepare you for a faculty position	○	○	○	○	○
Acquire a teaching certificate	○	○	○	○	○
Enhance your ability to find employment	○	○	○	○	○

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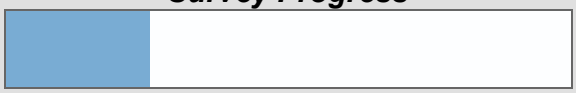
Survey Progress



Longitudinal Study of FUTURE STEM FACULTY

How often have you done (or did you do) the following during your graduate education and/or postdoctoral training?

	Never	Rarely	Sometimes	Often	Very Often
Talked with peers about teaching	○	○	○	○	○
Talked with family members about teaching	○	○	○	○	○
Talked with your advisor(s) about teaching	○	○	○	○	○
Solicited student evaluations of your teaching	○	○	○	○	○
Reflected on your teaching experience	○	○	○	○	○
Solicited feedback on your teaching from your peers	○	○	○	○	○
Solicited feedback on your teaching from your supervisor(s)	○	○	○	○	○
Sought out information (e.g., books, articles, Internet resources) about teaching	○	○	○	○	○

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If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress

Longitudinal Study of FUTURE STEM FACULTY

Please tell us about your INTEREST in teaching.

When you began your doctoral degree program, how interested were you in teaching undergraduate students?

- Not at all interested
- Slightly interested
- Somewhat interested
- Very interested
- Extremely interested

How interested are you in teaching undergraduate students *now*?

- Not at all interested
- Slightly interested
- Somewhat interested
- Very interested
- Extremely interested

How much has your interest in teaching been affected by your doctoral advisor's attitude toward teaching?

- Large decrease
- Moderate decrease
- Slight decrease
- No effect
- Slight increase
- Moderate increase
- Large increase

How much has your interest in teaching been (or was your interest in teaching) affected by the overall attitude toward teaching in your doctoral program/department?

- Large decrease
- Moderate decrease
- Slight decrease
- No effect
- Slight increase
- Moderate increase
- Large increase

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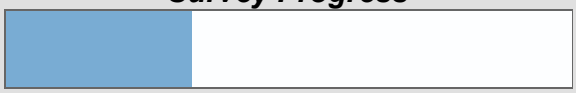
If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress



Longitudinal Study of FUTURE STEM FACULTY

During your graduate education and/or postdoctoral training, how much has your INTEREST in teaching undergraduate students been (or was your interest in teaching undergraduate students) affected by each of the following activities?

Participating in teaching-focused professional development activities

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Teaching undergraduate students as a TA, instructor, or guest lecturer

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Mentoring undergraduate research

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Observing another person's teaching

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Talking with peers about teaching

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Talking with family members about teaching

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Talking with your advisor(s) about teaching

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Reviewing student evaluations of your teaching

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Reflecting on your teaching experience

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Receiving feedback on your teaching from your peers

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Receiving feedback on your teaching from your supervisor(s)

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Seeking out information (e.g., books, articles, Internet resources) about teaching

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

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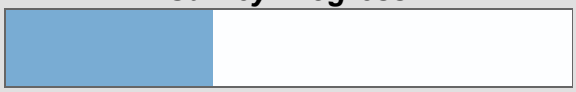
Survey Progress



Longitudinal Study of FUTURE STEM FACULTY

Please tell us about your career goals.

When you began your doctoral degree program, what was your *primary* career goal? *(Select one)*

- ○ Faculty career at a college or university
- ○ Research career in government, industry or business
- ○ Start your own business
- ○ Undecided
- ○ Other *(please specify):* _____

What is your *primary* career goal *now*? *(Select one)*

- ○ Tenure-track faculty career at a research-intensive college or university
- ○ Tenure-track faculty career at a teaching-intensive college or university
- ○ Non-tenure-track faculty career
- ○ Non-faculty research career at a university or university-affiliated research institute
- ○ Research career in government, industry or business
- ○ Start your own business
- ○ Undecided
- ○ Other *(please specify):* _____

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If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress

Longitudinal Study of FUTURE STEM FACULTY

The following seven questions ask about your CONFIDENCE with college teaching. Please indicate your level of confidence, even if you haven't had any teaching experience.

Regarding *designing a course*, how confident are you in your ability to do each of the following?

	Not at all confident	Slightly confident	Somewhat confident	Very confident	Extremely confident
Set learning goals	○	○	○	○	○
Select textbooks and/or readings	○	○	○	○	○
Design student assignments	○	○	○	○	○
Plan class exercises/activities	○	○	○	○	○
Determine grading criteria	○	○	○	○	○

Regarding *classroom teaching*, how confident are you in your ability to do each of the following?

	Not at all confident	Slightly confident	Somewhat confident	Very confident	Extremely confident
Use a variety of teaching strategies to support learning	○	○	○	○	○
Clearly communicate your expectations to your students	○	○	○	○	○
Actively engage students in learning activities	○	○	○	○	○
Give students opportunities to build confidence by practicing skills	○	○	○	○	○
Provide class activities in which students collaborate with one another	○	○	○	○	○

Regarding *the classroom environment*, how confident are you in your ability to do each of the following?

	Not at all confident	Slightly confident	Somewhat confident	Very confident	Extremely confident

Encourage students to ask questions during class	○	○	○	○	○
Encourage students to express their ideas in class	○	○	○	○	○
Encourage participation from women and minorities	○	○	○	○	○
Encourage students to respect one another in class	○	○	○	○	○
Manage student-instructor disagreements	○	○	○	○	○

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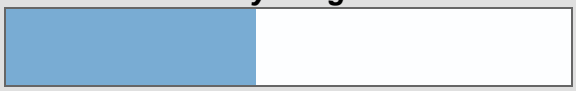
If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress



Longitudinal Study of FUTURE STEM FACULTY

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Regarding *assessing student learning*, how confident are you in your ability to do each of the following?

	Not at all confident	Slightly confident	Somewhat confident	Very confident	Extremely confident
Develop methods for assessing student learning that are consistent with the learning objectives for the course	○	○	○	○	○
Accurately assess students' knowledge of the subject matter	○	○	○	○	○
Grade students' assignments using clear criteria	○	○	○	○	○
Provide students with constructive suggestions on how to improve their course performance	○	○	○	○	○
Provide students with prompt feedback about their performance at regular intervals throughout the term	○	○	○	○	○

Regarding *interacting with students*, how confident are you in your ability to do each of the following?

	Not at all confident	Slightly confident	Somewhat confident	Very confident	Extremely confident
Foster students' independent thinking	○	○	○	○	○
Address sensitive issues in ways that help students to deal with them maturely	○	○	○	○	○
Foster students' confidence in their ability to learn on their own	○	○	○	○	○
Work with students who are having problems with course materials outside the classroom	○	○	○	○	○

Recognize students who are not achieving to their fullest potential	○	○	○	○	○

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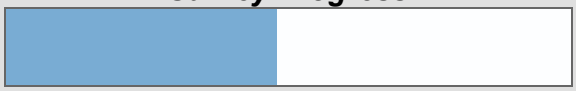
If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress



Longitudinal Study of FUTURE STEM FACULTY

Regarding *the subject you teach*, how confident are you in your ability to do each of the following?

	Not at all confident	Slightly confident	Somewhat confident	Very confident	Extremely confident
Provide students with an overview of your discipline	○	○	○	○	○
Demonstrate passion for the material you are teaching	○	○	○	○	○
Stay current in your knowledge of the subject matter	○	○	○	○	○
Help students understand the relevance of what they are learning	○	○	○	○	○
Enrich your teaching with your research	○	○	○	○	○

Regarding *the scholarship of teaching and learning* (i.e., systematic inquiry into teaching and learning), how confident are you in your ability to do each of the following?

	Not at all confident	Slightly confident	Somewhat confident	Very confident	Extremely confident
Use your assessments of student learning to improve your own teaching	○	○	○	○	○
Improve your teaching through self-reflection	○	○	○	○	○
Conduct research on teaching and learning	○	○	○	○	○
Publish research on teaching and learning	○	○	○	○	○
Influence departmental culture with respect to teaching	○	○	○	○	○

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If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress

Longitudinal Study of FUTURE STEM FACULTY

During your graduate education and/or postdoctoral training, how much has your CONFIDENCE in your ability to teach undergraduate students been (or was your confidence in your ability to teach undergraduate students) affected by each of the following?

Participating in teaching-focused professional development activities

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Teaching undergraduate students as a TA, instructor, or guest lecturer

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Mentoring undergraduate research

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Observing another person's teaching

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Talking with peers about teaching

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Talking with family members about teaching

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Talking with your advisor(s) about teaching

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Reviewing student evaluations of your teaching

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Reflecting on your teaching experience

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Receiving feedback on your teaching from your peers

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Receiving feedback on your teaching from your supervisor(s)

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

Seeking out information (e.g., books, articles, Internet resources) about teaching

Large decrease	Moderate decrease	Slight decrease	No effect	Slight increase	Moderate increase	Large increase	Not applicable
○	○	○	○	○	○	○	○

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Finally, we'd like to ask about your current employment.

Which of the following best describes your current employment status? *(Select one)*

- ○ Employed full-time in one position
- ○ Employed full-time in multiple positions
- ○ Employed part-time in one position
- ○ Employed part-time in multiple positions
- ○ Not employed, but still seeking employment
- ○ Not seeking employment because

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If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress

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What is the full name of the organization where you are employed?

Where is it located?

- In the U.S.
- Outside the U.S.

Which of the following employment sectors best describes this organization? *(Select one)*

- Associate's college (community college or technical institute)
- Bacclaureate college (liberal arts college or university)
- Master's college or university
- Doctorate-granting university (research college or university)
- Medical school (including university-affiliated hospitals and medical centers)
- Preschool, elementary, or secondary school
- University-affiliated research institute
- Government (other than educational institutions)
- Not-for-profit institution (e.g., foundation)
- Industry or business (for profit)
- Self-employed
- Other *(please specify):*

Which of the following job titles best describes your positions at this organization? *(Select all that apply)*

- [ ] Graduate teaching assistant
- [ ] Graduate research assistant
- [ ] Postdoctoral scholar, fellow, or associate
- [ ] Tenure-track assistant professor
- [ ] Associate professor (tenure track or tenured)
- [ ] Tenured full professor
- [ ] Visiting faculty
- [ ] Lecturer / Instructor
- [ ] Adjunct professor
- [ ] Researcher / Scientist (not a postdoc)
- [ ] Research professor
- [ ] Clinical professor / teaching professor
- [ ] Engineer
- [ ] Elementary or secondary school teacher

- [ ] Administrator or manager
- [ ] Other *(please specify):*

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How many *organizations* do you currently work for?

- 1
- 2
- 3
- 4 or more

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If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress

Longitudinal Study of FUTURE STEM FACULTY

What is the full name of the first organization where you are employed?

Where is it located?

- ○ In the U.S.
- ○ Outside the U.S.

Which of the following employment sectors best describes this organization? *(Select one)*

- ○ Associate's college (community college or technical institute)
- ○ Bacclaureate college (liberal arts college or university)
- ○ Master's college or university
- ○ Doctorate-granting university (research college or university)
- ○ Medical school (including university-affiliated hospitals and medical centers)
- ○ Preschool, elementary, or secondary school
- ○ University-affiliated research institute
- ○ Government (other than educational institutions)
- ○ Not-for-profit institution (e.g., foundation)
- ○ Industry or business (for profit)
- ○ Self-employed
- ○ Other *(please specify):*

Which of the following job titles best describes your positions at this organization? *(Select all that apply)*

- ☐ Graduate teaching assistant
- ☐ Graduate research assistant
- ☐ Postdoctoral scholar, fellow, or associate
- ☐ Tenure-track assistant professor
- ☐ Associate professor (tenure track or tenured)
- ☐ Tenured full professor
- ☐ Visiting faculty
- ☐ Lecturer / Instructor
- ☐ Adjunct professor
- ☐ Researcher / Scientist (not a postdoc)
- ☐ Research professor
- ☐ Clinical professor / teaching professor
- ☐ Engineer
- ☐ Elementary or secondary school teacher

- [ ] Administrator or manager
- [ ] Other *(please specify):*

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Longitudinal Study of FUTURE STEM FACULTY

What is the full name of the second organization where you are employed?

Where is it located?

- In the U.S.
- Outside the U.S.

Which of the following employment sectors best describes this organization? *(Select one)*

- Associate's college (community college or technical institute)
- Bacclaureate college (liberal arts college or university)
- Master's college or university
- Doctorate-granting university (research college or university)
- Medical school (including university-affiliated hospitals and medical centers)
- Preschool, elementary, or secondary school
- University-affiliated research institute
- Government (other than educational institutions)
- Not-for-profit institution (e.g., foundation)
- Industry or business (for profit)
- Self-employed
- Other *(please specify):*

Which of the following job titles best describes your positions at this organization? *(Select all that apply)*

- Graduate teaching assistant
- Graduate research assistant
- Postdoctoral scholar, fellow, or associate
- Tenure-track assistant professor
- Associate professor (tenure track or tenured)
- Tenured full professor
- Visiting faculty
- Lecturer / Instructor
- Adjunct professor
- Researcher / Scientist (not a postdoc)
- Research professor
- Clinical professor / teaching professor
- Engineer
- Elementary or secondary school teacher

- [ ] Administrator or manager
- [ ] Other *(please specify):*

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Thinking about your work responsibilities, on which of the following activities did you spend the most time over the past six months? *(Select one)*

- ○ Teaching graduate or professional students
- ○ Teaching undergraduate students
- ○ Research
- ○ Management / administration
- ○ Service / committee work
- ○ Other *(please specify):*

In order to better understand how the experiences of current and former STEM doctoral students change over time, we will conduct a follow-up study in 2013. Please tell us how we may best reach you in the future:

Name	
Street Address	
City	
State	
Country	
Zip	
Email	

We maintain strict standards of confidentiality and will not release your information to anyone outside the project.

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Survey Progress

Longitudinal Study of FUTURE STEM FACULTY

If you have any comments about this survey or about your perspectives on teaching, please enter them below.

This is the last page of the survey. Please click 'SUBMIT' to submit your answers.

BACK SUBMIT

If you have any questions or comments about this survey, please contact the UW Survey Center.

Survey Progress

Longitudinal Study of FUTURE STEM FACULTY

Thank you for your participation in this study! Your continued participation in this important research is crucial to the findings we make and their potential impact on policy and practice.

If you have any questions or comments about this survey, please contact the UW Survey Center.