

Supplemental Material

CBE—Life Sciences Education

Drew *et al.*

Enrollment by race and gender

Term	College		Gender	Race	N
201108	CALS	ftic	F	American Indian or Alaska Native (I)	1
201108	CALS	ftic	F	Asian (A)	21
201108	CALS	ftic	F	Black or African American (B)	8
201108	CALS	ftic	F	Hispanic/Latino (H)	15
201108	CALS	ftic	F	Native Hawaiian or Other Pacific Island	1
201108	CALS	ftic	F	Race and Ethnicity Unknown (X)	1
201108	CALS	ftic	F	Two or More Races (M)	5
201108	CALS	ftic	F	White (W)	56
201108	CALS	ftic	M	Asian (A)	14
201108	CALS	ftic	M	Black or African American (B)	5
201108	CALS	ftic	M	Hispanic/Latino (H)	12
201108	CALS	ftic	M	Nonresident Alien (O)	2
201108	CALS	ftic	M	Race and Ethnicity Unknown (X)	3
201108	CALS	ftic	M	Two or More Races (M)	3
201108	CALS	ftic	M	White (W)	60
201108	CALS	transfer	F	Asian (A)	2
201108	CALS	transfer	F	Black or African American (B)	1
201108	CALS	transfer	F	Hispanic/Latino (H)	6
201108	CALS	transfer	F	Two or More Races (M)	1
201108	CALS	transfer	F	White (W)	16
201108	CALS	transfer	M	American Indian or Alaska Native (I)	1
2011	CALS	transfer	M	Asian (A)	3
2011	CALS	transfer	M	Black or African American (B)	1
2011	CALS	transfer	M	Hispanic/Latino (H)	8
2011	CALS	transfer	M	Race and Ethnicity Unknown (X)	4
2011	CALS	transfer	M	White (W)	15
2011	DE MCS		F	Asian (A)	1
2011	DE MCS		F	Hispanic/Latino (H)	2
2011	DE MCS		F	Race and Ethnicity Unknown (X)	1
2011	DE MCS		F	White (W)	5
2011	DE MCS		M	Hispanic/Latino (H)	1
2011	DE MCS		M	White (W)	1
2011	CLAS	ftic	F	American Indian or Alaska Native (I)	2
2011	CLAS	ftic	F	Asian (A)	58
2011	CLAS	ftic	F	Black or African American (B)	18
2011	CLAS	ftic	F	Hispanic/Latino (H)	36
2011	CLAS	ftic	F	Native Hawaiian or Other Pacific Island	1
2011	CLAS	ftic	F	Race and Ethnicity Unknown (X)	6
2011	CLAS	ftic	F	Two or More Races (M)	5
2011	CLAS	ftic	F	White (W)	76
2011	CLAS	ftic	M	Asian (A)	31
2011	CLAS	ftic	M	Black or African American (B)	8
2011	CLAS	ftic	M	Hispanic/Latino (H)	15
2011	CLAS	ftic	M	Native Hawaiian or Other Pacific Island	3
2011	CLAS	ftic	M	Race and Ethnicity Unknown (X)	5
2011	CLAS	ftic	M	Two or More Races (M)	1
2011	CLAS	ftic	M	White (W)	60
2011	CLAS	transfer	F	Asian (A)	1

2011 CLAS	transfer	F	Hispanic/Latino (H)	2
2011 CLAS	transfer	F	Nonresident Alien (O)	1
2011 CLAS	transfer	F	White (W)	4
2011 CLAS	transfer	M	Asian (A)	1
2011 CLAS	transfer	M	Black or African American (B)	1
2011 CLAS	transfer	M	Hispanic/Latino (H)	3
2011 CLAS	transfer	M	Race and Ethnicity Unknown (X)	1
2012 CALS	ftic	F	Asian (A)	14
2012 CALS	ftic	F	Black or African American (B)	6
2012 CALS	ftic	F	Hispanic/Latino (H)	16
2012 CALS	ftic	F	Native Hawaiian or Other Pacific Island	1
2012 CALS	ftic	F	Race and Ethnicity Unknown (X)	5
2012 CALS	ftic	F	Two or More Races (M)	4
2012 CALS	ftic	F	White (W)	47
2012 CALS	ftic	M	Asian (A)	16
2012 CALS	ftic	M	Black or African American (B)	3
2012 CALS	ftic	M	Hispanic/Latino (H)	11
2012 CALS	ftic	M	Nonresident Alien (O)	1
2012 CALS	ftic	M	Race and Ethnicity Unknown (X)	4
2012 CALS	ftic	M	Two or More Races (M)	3
2012 CALS	ftic	M	White (W)	45
2012 CALS	transfer	F	American Indian or Alaska Native (I)	1
2012 CALS	transfer	F	Asian (A)	1
2012 CALS	transfer	F	Black or African American (B)	3
2012 CALS	transfer	F	Hispanic/Latino (H)	7
2012 CALS	transfer	F	White (W)	15
2012 CALS	transfer	M	Asian (A)	1
2012 CALS	transfer	M	Hispanic/Latino (H)	5
2012 CALS	transfer	M	Native Hawaiian or Other Pacific Island	3
2012 CALS	transfer	M	Race and Ethnicity Unknown (X)	6
2012 CALS	transfer	M	White (W)	19
2012 DE MCS	ftic	F	Asian (A)	1
2012 DE MCS	transfer	F	Hispanic/Latino (H)	5
2012 DE MCS	transfer	F	White (W)	13
2012 DE MCS	transfer	M	Black or African American (B)	1
2012 DE MCS	transfer	M	Hispanic/Latino (H)	1
2012 DE MCS	transfer	M	White (W)	2
2012 CLAS	ftic	F	Asian (A)	53
2012 CLAS	ftic	F	Black or African American (B)	16
2012 CLAS	ftic	F	Hispanic/Latino (H)	41
2012 CLAS	ftic	F	Native Hawaiian or Other Pacific Island	5
2012 CLAS	ftic	F	Race and Ethnicity Unknown (X)	5
2012 CLAS	ftic	F	Two or More Races (M)	6
2012 CLAS	ftic	F	White (W)	83
2012 CLAS	ftic	M	Asian (A)	40
2012 CLAS	ftic	M	Black or African American (B)	7
2012 CLAS	ftic	M	Hispanic/Latino (H)	32
2012 CLAS	ftic	M	Native Hawaiian or Other Pacific Island	2
2012 CLAS	ftic	M	Race and Ethnicity Unknown (X)	4

2012 CLAS	ftic	M	Two or More Races (M)	3
2012 CLAS	ftic	M	White (W)	74
2012 CLAS	transfer	F	Asian (A)	3
2012 CLAS	transfer	F	Hispanic/Latino (H)	2
2012 CLAS	transfer	F	White (W)	4
2012 CLAS	transfer	M	Asian (A)	2
2012 CLAS	transfer	M	Black or African American (B)	1
2012 CLAS	transfer	M	Hispanic/Latino (H)	2
2012 CLAS	transfer	M	Race and Ethnicity Unknown (X)	1
2012 CLAS	transfer	M	White (W)	2
2013 CALS	ftic	F	Asian (A)	9
2013 CALS	ftic	F	Black or African American (B)	3
2013 CALS	ftic	F	Hispanic/Latino (H)	21
2013 CALS	ftic	F	Native Hawaiian or Other Pacific Island	4
2013 CALS	ftic	F	Race and Ethnicity Unknown (X)	4
2013 CALS	ftic	F	Two or More Races (M)	4
2013 CALS	ftic	F	White (W)	41
2013 CALS	ftic	M	Asian (A)	13
2013 CALS	ftic	M	Black or African American (B)	3
2013 CALS	ftic	M	Hispanic/Latino (H)	9
2013 CALS	ftic	M	Native Hawaiian or Other Pacific Island	1
2013 CALS	ftic	M	Race and Ethnicity Unknown (X)	6
2013 CALS	ftic	M	Two or More Races (M)	3
2013 CALS	ftic	M	White (W)	53
2013 CALS	transfer	F	Asian (A)	1
2013 CALS	transfer	F	Black or African American (B)	3
2013 CALS	transfer	F	Hispanic/Latino (H)	10
2013 CALS	transfer	F	White (W)	11
2013 CALS	transfer	M	Asian (A)	1
2013 CALS	transfer	M	Black or African American (B)	2
2013 CALS	transfer	M	Hispanic/Latino (H)	4
2013 CALS	transfer	M	Native Hawaiian or Other Pacific Island	1
2013 CALS	transfer	M	Race and Ethnicity Unknown (X)	2
2013 CALS	transfer	M	Two or More Races (M)	1
2013 CALS	transfer	M	White (W)	23
2013 DE MCS	ftic	F	Asian (A)	1
2013 DE MCS	transfer	F	Black or African American (B)	1
2013 DE MCS	transfer	F	Hispanic/Latino (H)	9
2013 DE MCS	transfer	F	Race and Ethnicity Unknown (X)	4
2013 DE MCS	transfer	F	Two or More Races (M)	1
2013 DE MCS	transfer	F	White (W)	11
2013 DE MCS	transfer	M	Black or African American (B)	3
2013 DE MCS	transfer	M	Hispanic/Latino (H)	5
2013 DE MCS	transfer	M	Race and Ethnicity Unknown (X)	1
2013 DE MCS	transfer	M	White (W)	5
2013 CLAS	ftic	F	Asian (A)	52
2013 CLAS	ftic	F	Black or African American (B)	15
2013 CLAS	ftic	F	Hispanic/Latino (H)	34
2013 CLAS	ftic	F	Native Hawaiian or Other Pacific Island	3

2013 CLAS	ftic	F	Nonresident Alien (O)	2
2013 CLAS	ftic	F	Race and Ethnicity Unknown (X)	8
2013 CLAS	ftic	F	Two or More Races (M)	6
2013 CLAS	ftic	F	White (W)	80
2013 CLAS	ftic	M	Asian (A)	29
2013 CLAS	ftic	M	Black or African American (B)	3
2013 CLAS	ftic	M	Hispanic/Latino (H)	38
2013 CLAS	ftic	M	Native Hawaiian or Other Pacific Island	1
2013 CLAS	ftic	M	Race and Ethnicity Unknown (X)	3
2013 CLAS	ftic	M	Two or More Races (M)	5
2013 CLAS	ftic	M	White (W)	65
2013 CLAS	transfer	F	Asian (A)	4
2013 CLAS	transfer	F	Hispanic/Latino (H)	6
2013 CLAS	transfer	F	Race and Ethnicity Unknown (X)	1
2013 CLAS	transfer	F	Two or More Races (M)	1
2013 CLAS	transfer	F	White (W)	5
2013 CLAS	transfer	M	Asian (A)	2
2013 CLAS	transfer	M	Black or African American (B)	1
2013 CLAS	transfer	M	Hispanic/Latino (H)	5
2013 CLAS	transfer	M	Nonresident Alien (O)	1
2013 CLAS	transfer	M	Race and Ethnicity Unknown (X)	1
2013 CLAS	transfer	M	White (W)	6
2014 CALS	ftic	F	Asian (A)	12
2014 CALS	ftic	F	Black or African American (B)	3
2014 CALS	ftic	F	Hispanic/Latino (H)	18
2014 CALS	ftic	F	Native Hawaiian or Other Pacific Island	2
2014 CALS	ftic	F	Race and Ethnicity Unknown (X)	2
2014 CALS	ftic	F	Two or More Races (M)	2
2014 CALS	ftic	F	White (W)	51
2014 CALS	ftic	M	Asian (A)	10
2014 CALS	ftic	M	Black or African American (B)	2
2014 CALS	ftic	M	Hispanic/Latino (H)	12
2014 CALS	ftic	M	Native Hawaiian or Other Pacific Island	2
2014 CALS	ftic	M	Race and Ethnicity Unknown (X)	5
2014 CALS	ftic	M	Two or More Races (M)	2
2014 CALS	ftic	M	White (W)	42
2014 CALS	transfer	F	Asian (A)	4
2014 CALS	transfer	F	Black or African American (B)	1
2014 CALS	transfer	F	Hispanic/Latino (H)	6
2014 CALS	transfer	F	Nonresident Alien (O)	1
2014 CALS	transfer	F	White (W)	15
2014 CALS	transfer	M	American Indian or Alaska Native (I)	1
2014 CALS	transfer	M	Asian (A)	2
2014 CALS	transfer	M	Black or African American (B)	2
2014 CALS	transfer	M	Hispanic/Latino (H)	10
2014 CALS	transfer	M	Nonresident Alien (O)	1
2014 CALS	transfer	M	Race and Ethnicity Unknown (X)	1
2014 CALS	transfer	M	White (W)	15
2014 DE MCS	ftic	F	Asian (A)	1

2014 DE MCS	ftic	F	Race and Ethnicity Unknown (X)	1
2014 DE MCS	ftic	F	White (W)	1
2014 DE MCS	transfer	F	Black or African American (B)	6
2014 DE MCS	transfer	F	Hispanic/Latino (H)	14
2014 DE MCS	transfer	F	Native Hawaiian or Other Pacific Island	1
2014 DE MCS	transfer	F	Race and Ethnicity Unknown (X)	4
2014 DE MCS	transfer	F	Two or More Races (M)	2
2014 DE MCS	transfer	F	White (W)	13
2014 DE MCS	transfer	M	Black or African American (B)	5
2014 DE MCS	transfer	M	Hispanic/Latino (H)	5
2014 DE MCS	transfer	M	Race and Ethnicity Unknown (X)	1
2014 DE MCS	transfer	M	White (W)	8
2014 CLAS	ftic	F	Asian (A)	43
2014 CLAS	ftic	F	Black or African American (B)	14
2014 CLAS	ftic	F	Hispanic/Latino (H)	47
2014 CLAS	ftic	F	Native Hawaiian or Other Pacific Island	2
2014 CLAS	ftic	F	Race and Ethnicity Unknown (X)	8
2014 CLAS	ftic	F	Two or More Races (M)	2
2014 CLAS	ftic	F	White (W)	94
2014 CLAS	ftic	M	Asian (A)	23
2014 CLAS	ftic	M	Black or African American (B)	3
2014 CLAS	ftic	M	Hispanic/Latino (H)	40
2014 CLAS	ftic	M	Race and Ethnicity Unknown (X)	2
2014 CLAS	ftic	M	Two or More Races (M)	5
2014 CLAS	ftic	M	White (W)	59
2014 CLAS	transfer	F	American Indian or Alaska Native (I)	1
2014 CLAS	transfer	F	Asian (A)	3
2014 CLAS	transfer	F	Black or African American (B)	1
2014 CLAS	transfer	F	Hispanic/Latino (H)	7
2014 CLAS	transfer	F	Native Hawaiian or Other Pacific Island	1
2014 CLAS	transfer	F	Race and Ethnicity Unknown (X)	1
2014 CLAS	transfer	F	White (W)	7
2014 CLAS	transfer	M	Asian (A)	3
2014 CLAS	transfer	M	Black or African American (B)	1
2014 CLAS	transfer	M	Hispanic/Latino (H)	7
2014 CLAS	transfer	M	Nonresident Alien (O)	1
2014 CLAS	transfer	M	Race and Ethnicity Unknown (X)	2
2014 CLAS	transfer	M	White (W)	8
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2015 CALS	ftic	F	Asian (A)	13
2015 CALS	ftic	F	Black or African American (B)	3
2015 CALS	ftic	F	Hispanic/Latino (H)	30
2015 CALS	ftic	F	Native Hawaiian or Other Pacific Island	2
2015 CALS	ftic	F	Nonresident Alien (O)	1
2015 CALS	ftic	F	Race and Ethnicity Unknown (X)	1
2015 CALS	ftic	F	Two or More Races (M)	4
2015 CALS	ftic	F	White (W)	53
2015 CALS	ftic	M	Asian (A)	11
2015 CALS	ftic	M	Black or African American (B)	4
2015 CALS	ftic	M	Hispanic/Latino (H)	20

2015 CALS	ftic	M	Native Hawaiian or Other Pacific Island	1
2015 CALS	ftic	M	Race and Ethnicity Unknown (X)	1
2015 CALS	ftic	M	Two or More Races (M)	3
2015 CALS	ftic	M	White (W)	43
2015 CALS	transfer	F	Asian (A)	5
2015 CALS	transfer	F	Black or African American (B)	2
2015 CALS	transfer	F	Hispanic/Latino (H)	10
2015 CALS	transfer	F	Nonresident Alien (O)	1
2015 CALS	transfer	F	White (W)	13
2015 CALS	transfer	M	American Indian or Alaska Native (I)	1
2015 CALS	transfer	M	Asian (A)	1
2015 CALS	transfer	M	Black or African American (B)	1
2015 CALS	transfer	M	Hispanic/Latino (H)	15
2015 CALS	transfer	M	Nonresident Alien (O)	1
2015 CALS	transfer	M	Race and Ethnicity Unknown (X)	1
2015 CALS	transfer	M	White (W)	19
2015 DE MCS	ftic	F	Black or African American (B)	1
2015 DE MCS	ftic	F	Race and Ethnicity Unknown (X)	1
2015 DE MCS	transfer	F	Asian (A)	2
2015 DE MCS	transfer	F	Black or African American (B)	5
2015 DE MCS	transfer	F	Hispanic/Latino (H)	16
2015 DE MCS	transfer	F	Race and Ethnicity Unknown (X)	6
2015 DE MCS	transfer	F	Two or More Races (M)	1
2015 DE MCS	transfer	F	White (W)	21
2015 DE MCS	transfer	M	Asian (A)	1
2015 DE MCS	transfer	M	Black or African American (B)	4
2015 DE MCS	transfer	M	Hispanic/Latino (H)	9
2015 DE MCS	transfer	M	Native Hawaiian or Other Pacific Island	1
2015 DE MCS	transfer	M	Race and Ethnicity Unknown (X)	1
2015 DE MCS	transfer	M	Two or More Races (M)	1
2015 DE MCS	transfer	M	White (W)	9
2015 CLAS	ftic	F	Asian (A)	48
2015 CLAS	ftic	F	Black or African American (B)	8
2015 CLAS	ftic	F	Hispanic/Latino (H)	55
2015 CLAS	ftic	F	Nonresident Alien (O)	2
2015 CLAS	ftic	F	Race and Ethnicity Unknown (X)	7
2015 CLAS	ftic	F	Two or More Races (M)	4
2015 CLAS	ftic	F	White (W)	86
2015 CLAS	ftic	M	Asian (A)	24
2015 CLAS	ftic	M	Black or African American (B)	3
2015 CLAS	ftic	M	Hispanic/Latino (H)	32
2015 CLAS	ftic	M	Nonresident Alien (O)	1
2015 CLAS	ftic	M	Race and Ethnicity Unknown (X)	4
2015 CLAS	ftic	M	Two or More Races (M)	3
2015 CLAS	ftic	M	White (W)	52
2015 CLAS	transfer	F	American Indian or Alaska Native (I)	1
2015 CLAS	transfer	F	Asian (A)	4
2015 CLAS	transfer	F	Hispanic/Latino (H)	6
2015 CLAS	transfer	F	Native Hawaiian or Other Pacific Island	1
2015 CLAS	transfer	F	White (W)	5

2015 CLAS	transfer	M	Asian (A)	1
2015 CLAS	transfer	M	Black or African American (B)	3
2015 CLAS	transfer	M	Hispanic/Latino (H)	6
2015 CLAS	transfer	M	Nonresident Alien (O)	1
2015 CLAS	transfer	M	Race and Ethnicity Unknown (X)	2
2015 CLAS	transfer	M	White (W)	10

Retention, time to degree, and demographics of transfer students who matriculated from fall 2011 - spring 2014
 Data for Figures 3 and 4

	Graduated in MCS	Graduated in STEM	Persisting in STEM	Not retained	Total
CALS TR	24	9	12	13	58
DE MCS	24	1	7	14	46

Number of semesters to graduate of transfer students who graduated in STEM

CALS TR	DE MCS
5	8
5	4
5	5
5	5
5	5
5	5
5	6
5	6
5	6
5	6
5	6
5	6
6	6
6	6
6	6
6	7
6	7
6	7
7	7
7	7
7	8
7	9
8	9
10	10
	10

Demographics of transfer cohorts who graduated with a B.S. in MCS

	DE MCS	CALS TR
Hispanic F	9	1
White F	7	5
Black F	0	2
unreported F	1	0
Asian F	0	1
American Indian F	0	1
Hispanic M	4	1
White M	2	10
Black M	1	1
unreported M	0	2
Asian M	0	0
American Indian M	0	0

Math and Science Courses	CALS TR		DE MCS		p-value (two-sided)
	Mean Grade	Standard Deviation	Mean Grade	Standard Deviation	
Calculus 1	3.31	0.65	3.31	0.65	0.160
Biology 1	3.39	0.82	3.43	0.76	0.854
Biology 1 (Lab)	3.47	0.83	3.65	0.78	0.438
Biology 2	3.42	0.76	3.35	0.55	0.712
Biology 2 (Lab)	3.50	0.76	3.53	0.58	0.862
Chemistry 1	3.06	1.02	3.29	0.59	0.329
Chemistry 1 (Lab)	3.19	0.98	3.38	0.79	0.477
Chemistry 2	3.17	1.17	3.43	0.66	0.357
Chemistry 2 (Lab)	3.32	0.92	3.80	0.56	0.033
Organic Chemistry 1	3.07	0.84	2.49	1.03	0.038
Organic Chemistry 2	3.06	0.79	2.92	1.04	0.305
Organic Chemistry (Lab)	3.46	0.49	3.37	0.71	0.630

Supplemental Table 1. Math and science prerequisite course grade averages for on-campus (CALs TR) and distance based (DE MCS) graduates who transferred into Microbiology and Cell Science between 2011- 14 academic years. The two transfer cohorts each consist of 24 students who have earned their B.S. in MCS. Courses represent those taken all students in cohort prior to transfer at respective community colleges. The mean course grades were compared with the Student's t-test and the two-sided p-value is shown. Mean course grades were calculated by converting the individual letter grades according to the standard CALS scale: A, 4.0; A-, 3.67; B+, 3.33; B, 3.0; B-, 2.67; C+, 2.33; C, 2.0; C-, 1.67; D+, 1.33; D, 1.0; D-, 0.67; E, 0.0. If a course was taken more than once, the first recorded grade was included in the analysis. None of the comparisons between the cohorts' course mean grades met the experiment-wide adjusted p-value threshold for significance of 0.004 or below.