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An Analysis of NMSI UTeach Replication Site Recruitment, Retention, Completion and Associated Student Factors

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ABSTRACT

This report provides an analysis of UTeach replication site performance in terms of recruitment of students into the program as well as retention of those students throughout the UTeach program. Data from replication sites participating in the UTeach program during a selection of terms (or cohort groups) are included in this report. We included students who began the UTeach program in fall 2008, spring 2009, fall 2009, spring 2010 or fall 2010 (a subset of the 25 UTeach cohort groups who have participated in UTeach to date). Within the study sample there was an overall attrition rate between course 1 and course 2 of 55.4% and an overall average completion rate (based on completing the student teaching requirement) of 19.4% (859 students). The highest average overall number of UTeach courses taken was at Western Kentucky University ($M = 4.9$) and the lowest at UC Berkeley ($M = 1.73$). WKU also had the highest overall completion rate (33%) for sites participating in all five study cohorts. Duration of participation in UTeach (at the institutional level) did not have a significant impact on the number of enrolled students, or the level of persistence in the program. Student factors did not play a significant role in program completion—although moderate positive correlations were found between student major, GPA, ethnicity and program completion.



INTRODUCTION

The UTeach Program (UTeach) is a secondary science, technology, engineering, and mathematics (STEM) teacher preparation program developed in Austin at the University of Texas in 1997. The program provides students the opportunity to major in a STEM discipline while obtaining a secondary teaching certification with no additional time or cost. The National Math and Science Initiative (NMSI) was formed through a grant from Exxon Mobil to help replicate three Texas-based programs focused on STEM education. One of these programs, UTeach, was targeted for replication by NMSI. NMSI contracted with the University of Texas for support from the UTeach institute to assist with program replication. The role of the UTeach Institute was to provide implementation support for replication sites as well as collecting data. In 2013, the Howard Hughes Medical Institute (HHMI) announced a major grant to NMSI to expand the UTeach program to ten research universities in the US. Five universities were funded to begin the UTeach program in fall 2014, with an additional five institutions to begin in fall 2015.

As of May 2015, the UTeach program is being replicated at 44 universities, in 21 states with full implementation at 25 universities and an additional 18 universities in various stages of implementation. The UTeach course sequence comprises a set of eight courses (nine for math majors) focused on developing skills necessary to teach STEM subjects in secondary education (see Figure 1).

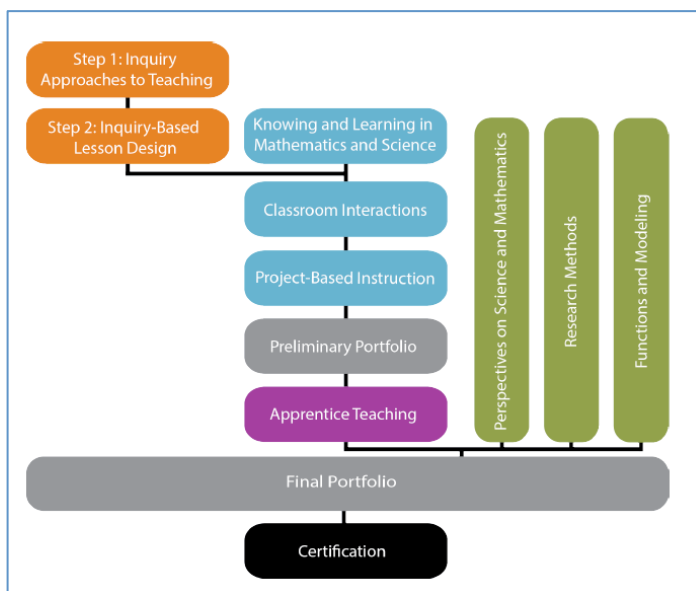


Figure 1: UTeach Curriculum Overview (UTeach Institute, 2014)

The program begins with students taking two courses designated as “recruitment” courses which allow them to try out teaching in math or science. Following these courses, students take a set of STEM education courses with concurrent specialized STEM content courses. The final component of the program is an apprentice teaching experience in which students engage in classroom observation and planning prior to a 12-week session of teaching



responsibilities (four hours a day). Additional information on specifics of the UTeach program and implementation across the country can be found in the earlier report on NMSI UTeach replication programs (Brown & Brandon, 2015).

The focus of the 2015 report was UTeach replication site performance in terms of recruitment, retention, generation of teacher graduates as well as an investigation of graduates' persistence in the teaching profession. This report provides a closer look at enrollment, program completion and associated student and institutional factors in a subset of UTeach replication site cohorts. Information on factors related to persistence in the program, or program completion may help influence recruitment and retention efforts. This report also provides early-stage data on the ten new universities added as a result of the HHMI grant. We focused on answering the following research questions:

1: Where has the UTeach program been implemented with the greatest efficiency (based on the percentage of students completing the program)?

- a) How many courses are students taking at the different sites?
- b) Does the number of courses taken change as a school participates in the program for longer?
- c) How many students at each site are completing 9 or more courses?
- d) How many students are completing the final student teaching requirements?

2: Which student factors predict successful adoption of the UTeach program?

3: What has been the participation rate at the 10 new universities added to the UTeach program as a result of the HHMI grant? How do these numbers compare to expected rates?

4: Are there institutional differences that correlate with the degree to which the program is adopted?

Study Sample

The analyses reported here include student cohorts from the sites who began the UTeach program in either fall 2008, spring 2009, fall 2009, spring 2010 or fall 2010. Cohorts comprise all students who began the UTeach program in the respective term, and not how many students were participating overall at each site at a particular time. The cohorts were selected to ensure we were analyzing data from students with sufficient time and opportunity to complete the UTeach program. The number of students in each cohort, as well as the number of participating sites is shown in Table 1. There were, for example, 583 students in Cohort 4 (students beginning in fall, 2008) and there were 90 students in Cohort 11 at the University of Texas Arlington.



Table 1: Number of students in each cohort group by site

		Term, Year, Cohort (N)				
		Fall 2008	Sp 2009	Fall 2009	Sp 2010	Fall 2010
Site	Site Name	4	6	8	10	11
11	University of Texas at Arlington					90
15	University of California, Berkeley	57	76	81	101	109
16	University of North Texas	54	38	91	39	92
22	University of Texas at Dallas	46	28	66	25	115
28	Middle Tennessee State University					49
31	University of Florida	40	37	38	42	68
34	Temple University	21	42	26	27	51
35	University of Colorado, Boulder	51	46	97	96	99
44	University of California, Irvine	30	33	31	59	46
47	University of Memphis					21
55	University of Texas at Tyler					46
57	University of Tennessee, Chattanooga					29
62	Western Kentucky University	29	14	72	45	81
63	University of Colorado, Colorado Springs					16
65	University of Kansas	84	44	86	69	106
67	University of Tennessee, Knoxville					61
69	Louisiana State University	16	112	123	68	122
71	Cleveland State University					60
82	Florida State University	41	39	70	57	83
86	Northern Arizona University	47	28	59	75	97
87	University of Houston	67	51	98	54	113
	Total	583	588	938	757	1,554

METHODOLOGY

For this report, we present the number of program participants as well as the number of courses in which students enrolled across multiple sites and cohort groups to explore program implementation, enrollment and persistence through the various stages of the UTeach replication model. The data presented model flow-through rates at each stage of the curriculum and provide information on the overall number of courses taken by students across the subset of replication sites. We also present data on completion rates and compare different criteria for determining program completion as well as differences in completion rates based on specific initial course sequences. Data are presented for each set of replication sites in a cohort and for each site individually. We also present preliminary data on potential student factors relating to program persistence and completion.



RESULTS

Research Question 1: Where has the UTeach program been implemented with the greatest efficiency?

Course Enrollment Patterns

To explore program implementation, enrollment and persistence, we looked at the number of UTeach courses students enrolled in at each of the sites. Table 2 shows the average number of UTeach courses taken by students at each of the sites in the five selected cohorts as well as the number of cohorts in which sites participated. On average, students at site 15 took the fewest courses ($M = 1.73$, $SD = 1.8$) and students at site 55, took the most ($M = 7.00$, $SD = 3.41$). The latter site, however, only began implementing the UTeach program in cohort 11, so these data are only for one cohort.

Table 2: Average number of courses taken by site

Site ID	Site Name	Students (N)	Courses (M)	Courses (SD)	Participation (# of cohorts)
11	University of Texas at Arlington	90	2.86	2.63	1
15	University of California, Berkeley	424	1.73	1.80	5
16	University of North Texas	314	4.37	3.28	5
22	University of Texas at Dallas	280	3.77	3.31	5
28	Middle Tennessee State University	49	3.10	3.09	1
31	University of Florida	225	2.90	2.96	5
34	Temple University	167	4.15	3.72	5
35	University of Colorado, Boulder	389	2.53	2.44	5
44	University of California, Irvine	199	2.81	3.56	5
47	University of Memphis	21	2.86	2.29	1
55	University of Texas at Tyler	46	7.00	3.41	1
57	University of Tennessee, Chattanooga	29	3.28	2.63	1
62	Western Kentucky University	241	4.90	3.57	5
63	University of Colorado, Colorado Springs	16	3.31	3.42	1
65	University of Kansas	389	4.31	3.39	5
67	University of Tennessee, Knoxville	61	3.57	3.20	1
69	Louisiana State University	441	3.17	2.99	5
71	Cleveland State University	60	4.48	3.32	1
82	Florida State University	290	3.65	3.32	5
86	Northern Arizona University	306	3.89	3.46	5
87	University of Houston	383	3.27	2.92	5

We next looked at the frequency of overall number of courses taken by the total sample ($N = 4,420$). Of this group, 44.4% ($N = 1,962$) of students took only one UTeach course, 5.5%



($N = 243$) took exactly 10 courses, and 1.4% ($N = 62$) took more than 10 courses (see Figure 2).

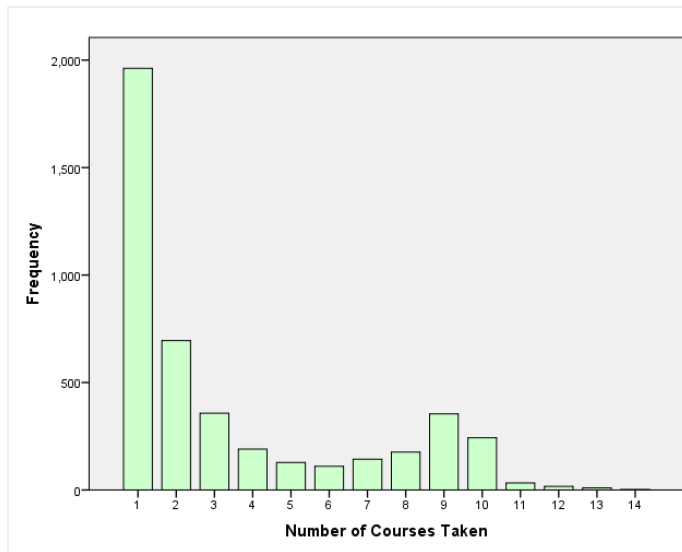


Figure 2: Frequency of UTeach courses taken

These data echo findings reported by Brown and Brandon (2015) in which there was a significant drop in program participation after the first course. In the current study sample, 4,420 students enrolled in one UTeach course, and only 2,458 enrolled in a second course. The level of student attrition, reported as the percentage of students at each site who dropped out after one course, is shown in Figure 3. The number on the top of each bar is the total number of students at each site. For example, site 31 had 225 overall students and over 50% of them took only one UTeach course.



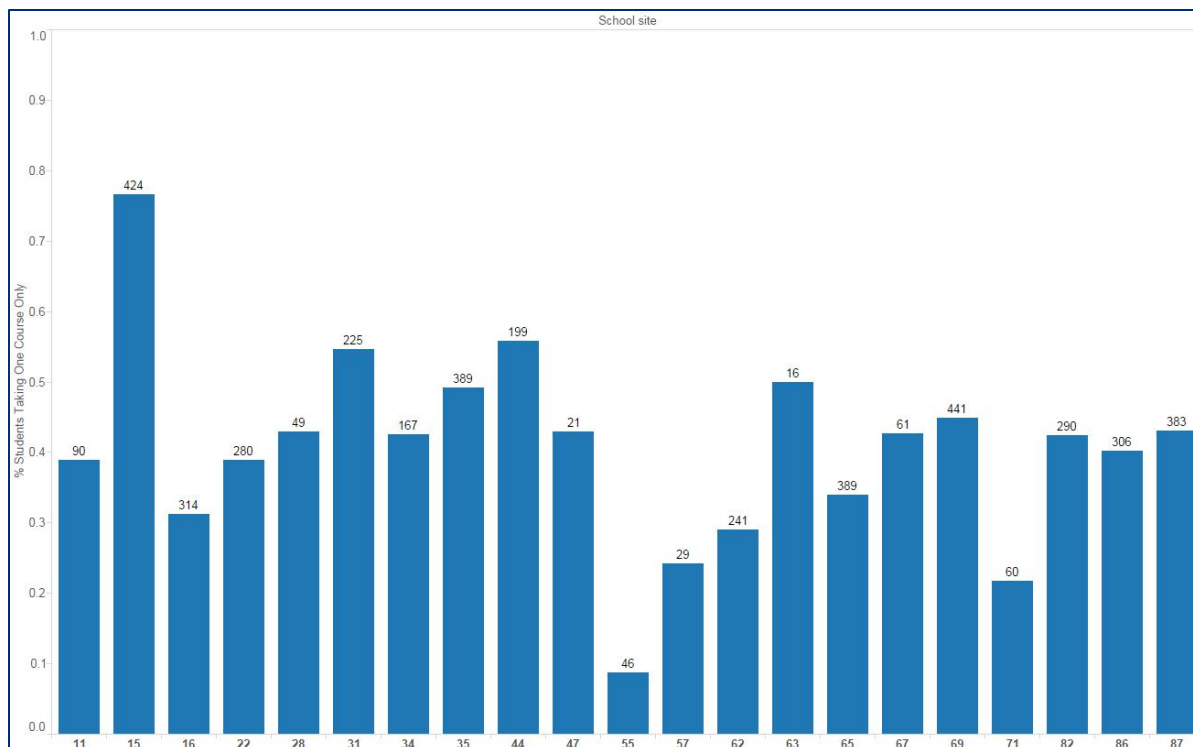


Figure 3: Overall student attrition (%) after one course (by site)

Additional data on the number of students at each site taking between 1-14 courses is included in Appendix A. As reflected in Figure 3, student attrition rates after one course ranged from 77% (site 15) to 9% (site 55).

We explored this attrition pattern further by looking at the “flow-through” of students enrolling in the UTeach program. Prior flow-through analyses (Brown & Brandon, 2015) used only data from those students who took the Step 1 course as their first course, and also presented flow-through from students at various stages of program completion. While Step 1 is the first of two “recruitment” courses typically described as the first course in the UTeach sequence and one which provides students the opportunity to try teaching without making a formal commitment, students do not always adhere to this sequence; Our preliminary analyses of students’ actual course sequences revealed differences in actual sequences from the expected or suggested course sequence. For example, of the 583 students who began the UTeach program in cohort 4, 463 took Step 1 as their first course, but the remainder took one of five other UTeach course options as their first course. In other words, contrary to our original expectations, students did not always take the UTeach courses in the order which is suggested in the UTeach curriculum sequence (UTeach Institute, 2014). And so, when exploring flow-through, we did not eliminate students who took an alternative course to Step 1 as their first course. Rather we looked at the number of students who took one course, and then how many took a second, and a third and so on



(regardless of the particular course in question). This approach took into account the fact that in most sites a number of students did not take Step 1 as their first course and so prior flow-through analyses likely underrepresented the number of students taking more than one course. We also modeled flow-rates at each stage of the curriculum.

As illustrated in Figure 4, there was a large drop in the number of participating students after one course—overall attrition at that point was 55.4%, and 28.27% between course 2 and 3.

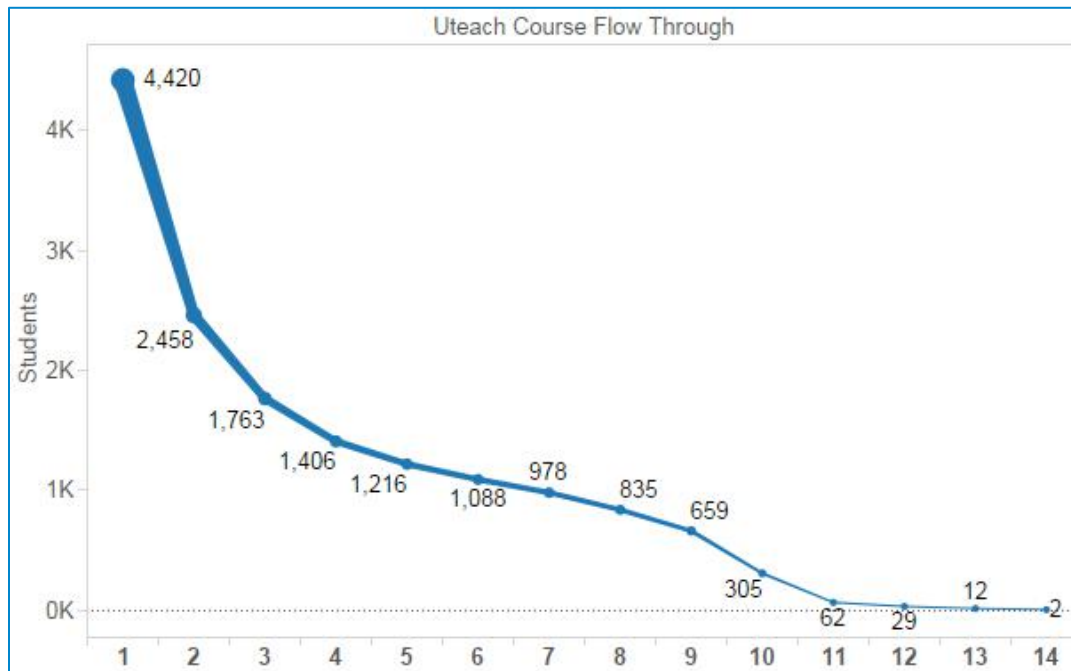


Figure 4: Participant enrollment in UTeach courses (by number of courses)

Figure 5 shows participant enrollment in each of the five cohorts studied. Attrition rates following course 1 ranged from 39.2% (fall 2008) to 52.5% (spring 2010). Attrition was, in all cases, lower when students began the program in the fall semester vs. the spring semester. Beginning the program in the fall semester may be more conducive to program persistence (at least into a second course) as there is no long break in between the fall and spring semesters, as there is between spring and fall. Students may be more inclined to continue the program in the next semester if they are able to maintain their momentum between course 1 and course 2.



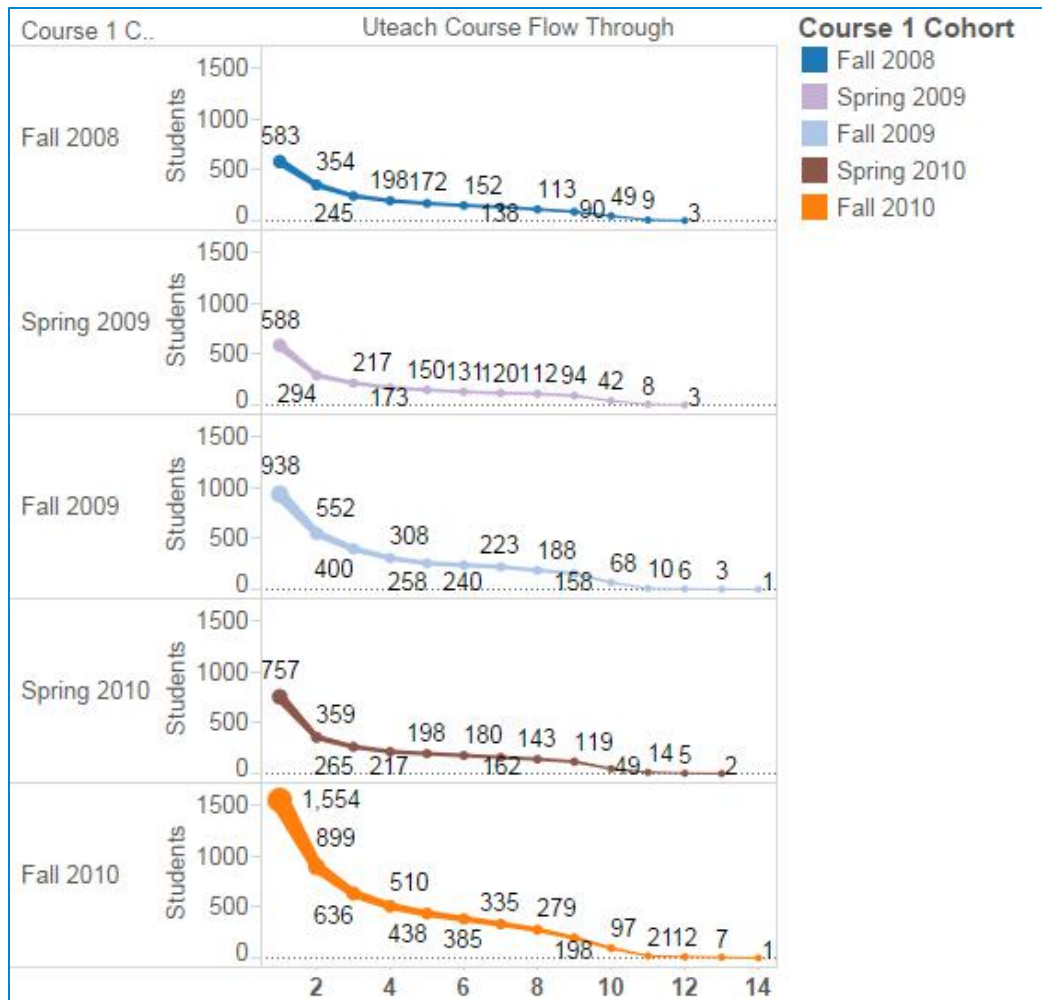


Figure 5: Participant enrollment in UTeach courses (by number of courses and cohort group)

Impact of Duration of Program Participation

The current sample included two exemplars of participation: sites had either participated in the UTeach program for one cohort ($N = 8$) or all five cohorts ($N = 13$). The average number of courses taken by students at each of the 13 sites participating in five cohorts is shown in Table 3 (overall student $N = 4,048$). Course data are reported by cohort and overall, across all five cohorts. The highest average overall number of UTeach courses taken was at Western Kentucky University ($M = 4.9$) and the lowest at UC Berkeley ($M = 1.73$). Only four sites had an overall average above four.



Table 3: Average Number of Courses by Site and Cohort

Site	Site Name	Average Number of Courses by Cohort					
		4	6	8	10	11	Overall
15	University of California, Berkeley	1.58	1.72	1.77	1.89	1.65	1.73
16	University of North Texas	3.87	4.79	4.77	4.33	4.12	4.37
22	University of Texas at Dallas	3.22	3.5	4.02	2.88	4.11	3.77
31	University of Florida	3.55	3.49	2.5	2.64	2.57	2.9
34	Temple University	3.9	3.95	5.23	4.52	3.67	4.15
35	University of Colorado, Boulder	2.45	3.04	2.45	2.17	2.77	2.53
44	University of California, Irvine	1.87	1.94	3.26	2.76	3.8	2.81
62	Western Kentucky University	6	5.57	5	5.2	4.12	4.9
65	University of Kansas	5.37	4.3	4.35	4.36	3.42	4.31
69	Louisiana State University	1.88	3.13	3.22	3.82	2.95	3.17
82	Florida State University	4.24	3.03	3.6	3.56	3.76	3.65
86	Northern Arizona University	4.15	3.71	4.95	3.21	3.68	3.89
87	University of Houston	3.43	3.59	2.72	3.61	3.35	3.27

A one-way ANOVA yielded no significant differences in average number of courses taken across the five cohorts (within sites). Between programs, however, there were significant differences in overall number of courses taken, $F(12, 4,035) = 26.36, p < .001$, with students at Western Kentucky University (for example) taking significantly more courses on average ($M = 4.9, SD = 3.57$) than all but three other sites (16, 65 and 34). Some sites experienced an increase in average number of courses taken and then a decline (e.g., site 34 or site 31), others (for the most part) decreased over time (e.g., site 62, or site 65).

Program Completion

Our earlier, exploratory analyses of the number and sequence of UTeach courses indicated very little uniformity both between and within sites. This made determining criteria for “completion” more complicated; students at the study sites took varying numbers of courses and in different sequences. We therefore calculated completion rates using different criteria and compared the outcomes. Based on the suggested sequence of UTeach courses we first calculated completion rate as the percentage of the total student group at each site who took nine or more UTeach courses (Completion 1).



The rationale behind the Completion 1 criteria was students taking nine or more UTeach courses would likely be those students who had completed the program. The UTeach program includes 12 possible courses—some variants on the nine original UTeach courses—although not all are taken by all students. For example students can take Step 1 and Step 2, or can take a combination of both courses (Step 1/2 combo), but typically, students would not take all three. Students can also enter the UTeach program at different points in their undergraduate career, resulting in variations in the UTeach course pathway.

Due to the variation in UTeach course sequencing between sites we were concerned we might be underestimating the percentage of students completing the UTeach program using the Completion 1 criteria. To address this, we identified alternative completion criteria as follows: Completion 2 = students who took the UTeach student teaching course; Completion 3 = students who took the UTeach student teaching seminar; Completion 4 = students who took both student teaching and student teaching seminar; and Completion 5 = students who took either student teaching or student teaching seminar. These courses were selected as they represent the final, apprentice teaching component of the UTeach program.

Table 4 below, contains all five potential completion rates by cohort group. Completion rates ranged from 12.74% to 16.84% for Completion 1 (9 or more courses); 18.60% to 20.36% for Completion 2 (took student teaching); 18.54% to 20.36% for Completion 3 (took student teaching seminar); 18.54% to 20.26% for Completion 4 (took both student teaching and student teaching seminar); and 18.73% to 20.93% for Completion 5 (took either student teaching or student teaching seminar). As expected, the original completion criteria (Completion 1) resulted in the most conservative completion rates. All alternative completion rates (Completion 2 to Completion 5) were higher than Completion 1 across all cohorts, and were also within 1 to 2 percentage points of each other. This is not surprising as most students who take student teaching also take student teaching seminar and so little additional information was gleaned from those additional completion criteria.

Table 4: Completion Percentages for the Overall Cohort Groups

Term Cohort	Total Students (N)	% Completion 1 (N)	% Completion 2 (N)	% Completion 3 (N)	% Completion 4 (N)	% Completion 5 (N)
Fall 2008	583	15.44 (90)	20.24 (118)	20.24 (118)	19.55 (114)	20.93 (122)
Spring 2009	588	15.99 (94)	19.39 (114)	18.54 (109)	18.54 (109)	19.39 (114)
Fall 2009	938	16.84 (158)	20.36 (191)	20.36 (191)	20.26 (190)	20.47 (192)
Spring 2010	757	15.72 (119)	19.42 (147)	19.55 (148)	19.42 (147)	19.55 (148)
Fall 2010	1,554	12.74 (198)	18.60 (289)	18.73 (291)	18.60 (289)	18.73 (291)



Due the similarities between the alternative completion rates and the fact that the student teaching component is a more certain indicator of completion, we included Completion 1 and Completion 2 in the subsequent analyses. We explored differences in overall completion rates (1 and 2) between the 21 study sites as well as overall. Using Completion 1, 659 students completed the UTeach program overall (a 14.9% completion rate). Using Completion 2, 859 of the 4,420 students in the sample (19.4%) completed the program.

Between sites, completion rates ranged from 0.9% to 52.2% for Completion 1 and 0% to 57% for Completion 2 (see Table 5).

Table 5: Comparison of Completion Rates by Site

Site ID	% Completion 1	% Completion 2	Change in Completion rate (Rate 2 - Rate 1)	Number of cohorts in which site participated (max 5)
55	52.2	57	4.8	1
62	29.5	33	3.5	5
71	15	32	17	1
16	18.8	30	11.2	5
65	23.7	29	5.3	5
34	24	26	2	5
86	20.3	25	4.7	5
82	19.3	20	0.7	5
22	16.1	19	2.9	5
63	18.8	19	0.2	1
67	16.4	18	1.6	1
69	13.8	18	4.2	5
31	12	17	5	5
35	4.9	15	10.1	5
87	9.9	14	4.1	5
44	11.6	12	0.4	5
57	10.3	10	-0.3	1
11	8.9	9	0.1	1
28	8.2	6	-2.2	1
15	0.9	4	3.1	5
47	4.8	0	-4.8	1

Three programs had a decrease in completion rate based on the revised calculation of completion rate (from 1 to 2), while the remaining sites had an increase. A decrease in completion rate signified that students had taken nine or more courses, but had not in fact ever taken the student teaching requirement. Conversely, an increase in completion rate (between 1 and 2) indicated situations where although students had not taken nine or more courses, they had in fact taken the student teaching requirement (typically the final



course in the sequence). These data underscore the lack of uniformity in the course sequences and show we must be cautious in defining success only by number of courses taken; doing so appears to under-estimate the number of students who are persisting to the student teaching component of UTeach.

Comparison of Completion Rate Based on Initial Courses

Given our observations of varying UTeach sequences, we compared completion rates based on first and second course taken. We first compared those taking Step 1 as their first course vs. any other course, and then compared completion rates for those students taking Step 1, then Step 2 vs. all other combinations (see Tables 6 and 7).

Table 6: Comparison of Completion Rates Based on First Course

First Course	Students (N)	Completion 1 (N)	Completion 2 (N)	Completion 1 (%)	Completion 2 (%)
Step 1	3,924	645	787	16.44	20.06
Other	496	14	72	2.82	14.52

Table 7: Comparison of Completion Rates Based on First and Second Course

First Course/Second Course	Students (N)	Completion 1 (N)	Completion 2 (N)	Completion 1 (%)	Completion 2 (%)
Step 1/Step 2	1,934	610	714	31.54	36.92
Step1/Other	345	35	73	10.14	21.16
Other/Step2	57	9	22	15.79	38.60
Other/Other	122	5	50	4.10	40.98

The data reveal a considerable increase in program completion (between rates 1 and 2) based on the courses taken as the first in the sequence—particularly for students taking an alternative course as their first course. For these students, only 2.82% completed nine or more courses, but using Completion 2 criteria, 14.52% completed the program. Students who took Step 1 as their first course had a Completion 2 rate of 20.06%. Using the Completion 2 criteria, those who took Step 1 first had a 20.06% completion rate compared to 14.52% for those who took a different course.

Students who took Step 1 and then Step 2 had a Completion 2 rate of 36.92%. Interestingly, when looking at two courses (Table 7) students who took alternative courses to Step 1 and Step 2 as their first courses had a Completion 2 rate of 40.98%. There were however, a relatively small number of these cases ($N = 50$). These data suggest that students not taking the initial courses in the suggested UTeach sequence are likely to complete the program in fewer than nine courses—based on the differences between Completion 1 and



2 for these students. While there is an increase in completion rate between 1 and 2 for the students taking Step 1 (for example) the increase is not as marked as for the students taking an alternate first course. This may be explained by site-specific differences in program implementation. Some UTeach sites (for example UC Berkeley’s Cal Teach Program) only require students to take an introductory course, followed by five core courses and the apprentice teaching component. And in these sites we would not expect to have students taking more than the required number of courses (7), even though they may still complete the program (based on their institution’s requirements).

The majority of students took Step 1 and Step 2 as their first courses and had a completion 2 rate of 36.92%. The highest completion rate, however, was for students who did not take either of these courses—although this only applied to 50 students.

Comparison of Completion Rates by Cohort

In all but one cohort (cohort 4—spring 2010) Completion rates 1 and 2 were highest for the same site and relative position remained the same. Schools with the highest completion rates in each cohort are shown below in Table 8.

Table 8: Highest Completion Rates by site and cohort

Term Cohort	Site	Students at site (N)	% Completion 1 (N)	% Completion 2 (N)
Fall 2008	Western Kentucky University	29	41.38 (12)	41.38 (12)
Spring 2009	Western Kentucky University	14	50.00 (7)	50.00 (7)
Fall 2009	Temple University	26	38.46 (10)	38.46 (10)
Spring 2010	Temple University	27	29.63 (8)	
Spring 2010	Western Kentucky University	45		37.78 (17)
Fall 2010	University of Texas at Tyler	46	52.17 (24)	56.52 (26)

Western Kentucky University (Site ID = 62) had the highest completion rates for fall 2008, spring 2009 and spring 2010. Temple University (Site ID = 34) also had the highest completion rates for multiple cohorts: fall 2009, and spring 2010. University of Texas at Tyler (Site ID = 55) was a first time participant in fall 2010 (Cohort 11), but had the highest completion for that time period. Overall completion rates by cohort were 20.24% (cohort 4), 19.39% (cohort 6), 20.36% (cohort 8), 19.42% (cohort 10), 18.6% (cohort 11).

Appendix B includes the cohort-specific completion rates for each of the school sites.



Comparison of Completion Rates by Program

Completion 1: Using a one-way analysis of variance, we compared the overall Completion 1 rates across all 21 sites. Completion 1 rates were statistically significantly different between sites, $F(20, 4,399) = 13.416, p < .001$. Tukey post-hoc analyses revealed group differences between the programs with four distinct sub-groups emerging across the 21 programs—means within the subset are not significantly different from one another. The Tukey post-hoc test revealed that Program 55 had the highest overall percent completion (55%) and was statistically significantly higher than all other programs (except Program 63 $M = 0.19 \pm .403$) and 71. Program 15 had the lowest completion rate ($M = .09 \pm .286$).

Completion 2: Using a one-way analysis of variance, we compared the overall Completion 2 rates across all 21 sites. Completion 2 rates were statistically significantly different between sites, $F(20, 4,399) = 12.994, p < .001$. Tukey post-hoc analyses revealed group differences between the programs with four distinct sub-groups emerging across the 21 programs—means within the subset are not significantly different from one another. The Tukey post-hoc test revealed that Program 55 had the highest overall percent completion (57%) and was statistically significantly higher than all other programs (except Program 63 $M = 0.19 \pm .403$). Program 47 had no students in the Completion 2 group—but this program only participated in cohort 11 and had 21 students in that cohort group. One student completed 9 courses, but no students reached the student teaching course.

We also compared Completion 2 rates for only the sites participating in all five cohort groups ($N = 13$). Results of the ANOVA revealed a statistically significant difference between sites, $F(12, 4,035) = 14.68, p < .001$. Completion 2 rates ranged from 4% (UC Berkeley) to 33% (Western Kentucky University). Tukey post-hoc analyses revealed group differences between the programs with six distinct sub-groups emerging across the 13 programs.

Sites Participating in Multiple Cohorts

We explored the impact of length of site participation (number of cohorts) on site-specific retention measured by Completion rate (1 and 2). The eight sites that only participated in cohort 11 (fall 2010) were removed for this analysis. Using multiple one-way ANOVAs we compared completion rates within each school site and discovered no significant trends except for site 65 where there was a significant difference in Completion 2 rate between cohort 4 ($M = .40, SD = .49$) and cohort 11 ($M = .18, SD = .46$), $F(4, 384) = 3.172, p < .05$. At this site there was a significant decrease in completion rate over time. Total student enrollment numbers also varied across the cohorts, in some cases doubling or tripling between one cohort and the next, which may have impacted the participating school site's ability to adjust and provide adequate support to all students within the program. Appendix C contains complete data on completion rates across all cohorts by site.



Research Question 2: Which student factors predict successful adoption of the UTeach program?

Student Demographics

To explore possible student factors impacting program completion, UTeach course enrollment and student demographic information were combined. Not all participating school sites provided complete student demographic information for students, so when necessary, the categories of “Missing/Not Reported” and “Missing” were created and included in the analyses. Over half of the students (58%) within the sample were female, 35% were male, and 7% of the sample had missing/non-reported gender information. Ethnicity breakdown of the total sample is shown in Figure 6. Approximately 23% of the students in the sample fell into one of the two categories other or missing/not reported.

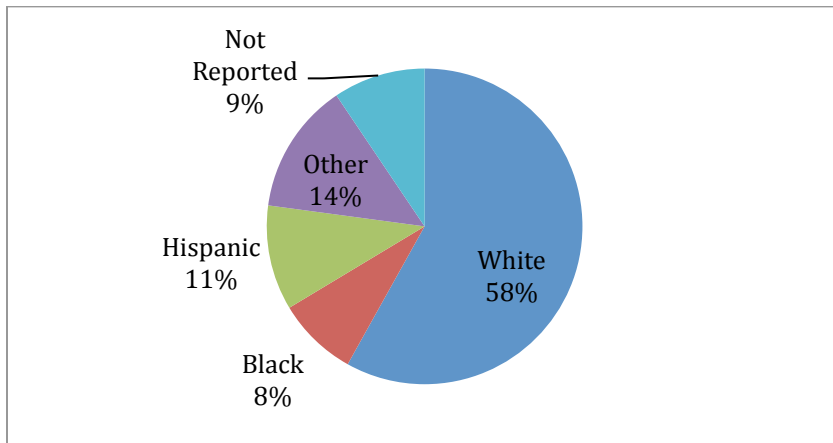


Figure 6: Ethnicity Distribution of Total Student Sample ($N = 4,420$)

Data on first degree sought by the student sample were collapsed into four categories (see Figure 7). As expected, the majority of the sample consisted of undergraduate students (Bachelor’s degree = 84%). A very small percentage (0.1%) of students were pursuing an undergraduate Associate’s degree and these students ($N = 4$) were included in the Bachelor’s degree group.



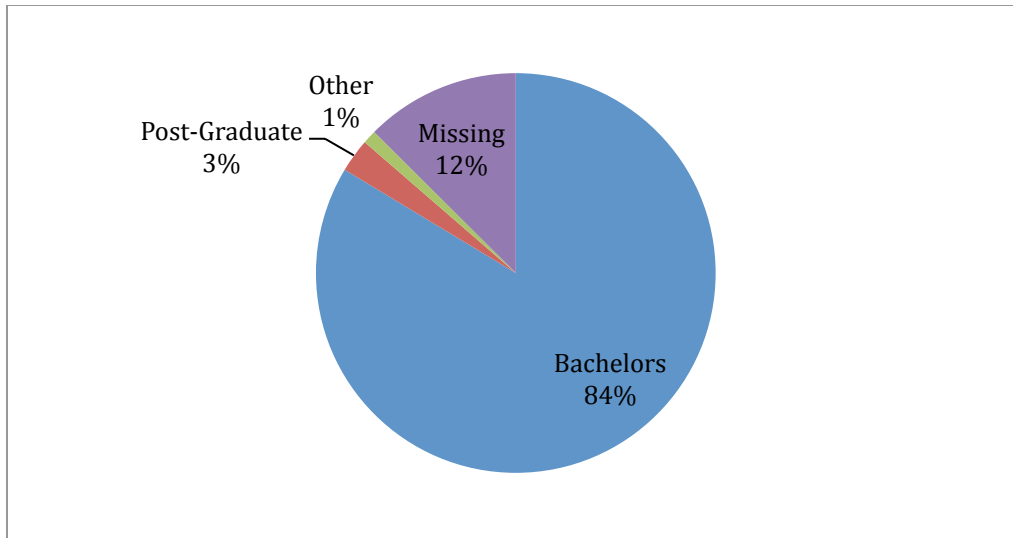


Figure 7: Distribution of first degree sought by UTeach sample

Frequency of student major category is shown in Table 9. We maintained all available major categories, but in subsequent analyses they could be collapsed into the following: STEM (68%); education (5%); other non-STEM (17%); and all remaining categories combined (8%). The UTeach program focuses on the active recruitment of STEM majors, so a majority of STEM students (68%) was expected; however, it was unclear why there would be such a large percentage of other non-STEM (17%) students within the sample.

Table 9: UTeach Student Demographics for Overall Sample: First Degree and Major Breakdowns

Major (* STEM Major)	N	Percent of sample
Astronomy*	12	0.3
Biology*	899	20.3
Chemistry*	241	5.5
Computer Science*	31	0.7
Education	239	5.5
Engineering*	121	2.7
Geo Science*	62	1.4
Mathematics*	1032	23.3
Non-Degree Seeker	11	0.2
Not Reported	313	7.1
Other Non-STEM	750	17.0
Other STEM*	475	10.7
Physics*	124	2.8
Undeclared	100	2.3
Missing	10	0.2



Demographic data reported by site are included in Appendix D.

Correlations between student demographics and completion

We conducted a correlation analysis to determine the relationship between pre-college performance indicators (ACT/SAT math scores), actual university performance levels (GPA), and UTeach completion rates. Moderate positive relationships were noted between the pre-college performance indicators and GPA (ACT Math: $r = .370, p < 0.01$ and SAT Math: $r = .333, p < 0.01$, respectively).

Completion 1 was positively correlated with ACT Math ($r = .107, p < 0.01$), SAT Math ($r = .065, p < 0.01$), and GPA ($r = .205, p < 0.01$). Completion 2 was also positively correlated with ACT Math ($r = .128, p < 0.01$), SAT Math ($r = .073, p < 0.01$), and Univ. GPA ($r = .250, p < 0.01$). The two completion rates were also highly correlated with each other ($r = .828, p < 0.01$), which should be expected since a majority of the students completing 9 or more courses (Completion 1) also took student teaching (Completion 2). Sample size differences in some cases were expected (SAT and ACT) while in other cases complete data were not provided by the sites. University performance levels (GPA) had positive relationships with both completion rates, but neither correlation was especially large which indicates that the measure will not be a strong factor in predicting successful completion of the UTeach program.

Table 10: Correlations between ACT Math, SAT Math, GPA, and Completion Rates

			1	2	3	4	5
1	Completion 1	Pearson Correlation	-	-	-	-	-
		N					
2	Completion 2	Pearson Correlation	.828**	-	-	-	-
		N	4420				
3	ACT Math	Pearson Correlation	.107**	.128**	-	-	-
		N	2351	2351			
4	SAT Math	Pearson Correlation	.065**	.073**	.809**	-	-
		N	2084	2084	988		
5	GPA	Pearson Correlation	.205**	.250**	.370**	.333**	-
		N	4036	4036	2311	2053	

** . Correlation is significant at the 0.01 level (2-tailed).



Sample sizes varied greatly in the data available for comparison. In some cases (ACT/SAT) students are only required to submit one of the two scores, and in other cases (e.g., GPA) data were not available from all sites.

We next explored the relationships between ethnicity categories and completion rates. A chi-square test for association was conducted between each of the ethnicity categories and Completion 2. There were significant associations with all groups, but in only one case (for white students) were there more students than expected completing the program (see Table 11).

Table 11: Summary of chi-square analysis of ethnicity and Completion 2 rates

Ethnicity category	N	Program Completion 2 Yes	Program Completion 2 No	χ^2	Significance	Fewer/More Than Expected	ϕ
White	2568	643	1925	122.953	.000	More	.167
Black	366	40	326	18.437	.000	Fewer	-.065
Hispanic	475	71	404	6.843	.009	Fewer	-.039
Other	594	86	508	10.766	.001	Fewer	-.049
Missing/Not Reported	417	19	398	65.094	.000	Fewer	-.121

We conducted a comparable analysis for Completion 1 and found similar results. Since no ethnicity category had a particularly strong relationship with either of the completion rates, ethnicity does not seem to be a major factor in predicting successful completion of the UTeach program, although overall white students were more successful as defined by program completion (33.4% completed the UTeach program).

The ethnicity breakdown of the UTeach graduates from the five study cohorts is shown in Figure 8. Of the 859 students who completed the program, 75% were white, 5% black, 8% Hispanic, 10% were other and 2% were not reported.



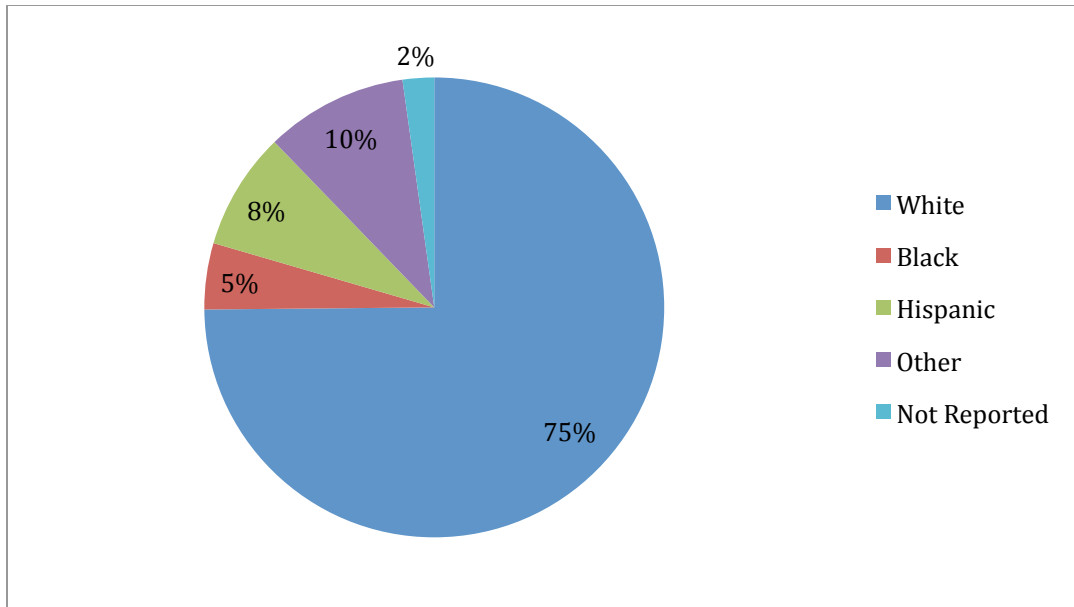


Figure 8: Ethnicity Distribution of Students Completing the Program ($N = 859$)

The relationship between gender and completion rates is shown in Table 12. There was a positive association between female gender and completion 2, and no significant association between male and completion 2. No strong relationship was shown between any gender category and either of the completion rates (although there were more females in the sample and they completed the program at higher than expected rates), so gender does not seem to be a significant factor in predicting successful completion of the UTeach program.

Table 12: Summary of chi-square analysis of gender and completion 2 rates

Gender category	N	Program Completion 2 Yes	Program Completion 2 No	χ^2	Significance	Fewer/More Than Expected	ϕ
Female	2541	533	1988	20.702	.000	More	.068
Male	1562	294	1268	.579	NS	—	-.011
Missing/Not reported	317	12	305	53.411	.000	Fewer	-.110

Weak positive relationships were observed between Bachelor's degree and both Completion 1 ($r = .124, p < 0.01$) and Completion 2 ($r = .101, p < 0.01$). No strong relationship was shown between any first degree sought category and either of the completion rates, so first degree sought does not seem to be a factor in predicting successful completion of the UTeach program.



We next examined the relationships between declared major and completion 2 rates. Weak associations were found for many of the major categories, but there was a statistically significant association between major and completion 2 for mathematics, $\chi^2(1) = 324.366$, $p < .001$, and there was a moderately strong association between majoring in math and program completion, $\phi = 0.28$, $p < .001$.

Research Question 3: *What is the participation rate at the 10 new universities added to the UTeach program as a result of the HHMI grant? How do these data compare to expected rates?*

In 2013, the Howard Hughes Medical Institute (HHMI) grant was awarded to the National Math and Science Initiative (NMSI) to enable expansion of the UTeach Program to ten major research universities. The first five schools funded (Drexel University; Florida International University; Oklahoma State University; University of Alabama at Birmingham; and University of Maryland, College Park) were announced in early 2014 and four of the five began implementation in fall 2014. The remaining schools (George Washington University; Louisiana Tech University; University of Massachusetts Boston; University of Nevada, Reno; and West Virginia University) were selected in December of 2014, and began implementation in fall 2015.

The analyses below focused on the first five schools, since student enrollment information was not available for all ten of the new sites. Table 13 presents the total number of courses taken (1 = only one course taken) as well as the number of students participating in the UTeach program at each site by cohort term. Implementation at these school sites began in fall 2014, so data was available for cohort groups 24 (fall 2014) and 25 (spring 2015). Drexel University supplied student enrollment information only for spring 2015.

Table 13: Preliminary HHMI Site Student Enrollment by cohort group

Cohort Group	Term/Year	Site ID	Site Name	Students (N)	Number of UTeach Courses	
					1	2
24	Fall 2014	36	Oklahoma State University	33	20	13
		66	Florida International University	64	38	26
		79	University of Maryland	35	18	17
		90	University of Alabama- Birmingham	70	34	36
			Combined Total	202	110	92
25	Spring 2015	36	Oklahoma State University	23	23	NA
		51	Drexel University	43	43	NA
		66	Florida International University	47	47	NA
		79	University of Maryland	39	39	NA
		90	University of Alabama- Birmingham	37	37	NA
			Combined Total	189	189	NA



Descriptive statistics were calculated for both HHMI and non-HHMI participating school sites to allow comparisons between HHMI participation rates and expected rates. Since only two terms of course information was available for the HHMI sites, new variables were created to ensure accurate comparisons. Tables 14 and 15 contain the mean number of courses taken for the HHMI and non-HHMI school sites during the first and second terms that students were included in the UTeach Program. The preliminary HHMI participation rates appear very similar to expected rates for the two cohort groups examined.

Table 14: Student Course Enrollment for First UTeach Term

Program Type	Courses (N)	Mean	SD	Minimum	Maximum
HHMI-24	202	1.00	0.000	1	1
HHMI-25	189	1.00	0.000	1	1
non-HHMI	16,766	1.16	0.444	1	5

Table 15: Student Course Enrollment for Second UTeach Term

Program Type	Courses (N)	Mean	SD	Minimum	Maximum
HHMI-24	92	1.00	0.000	1	1
non-HHMI	2,574	1.47	0.637	1	5

Data indicate similar drop off patterns between course 1 and course 2 in the HHMI group and in the sample as a whole. Of the 202 students who enrolled in a first UTeach course (in an HHMI site, cohort 24), 54.45% did not enroll in a second course.

Research Question 4: *Are there institutional differences that correlate with the degree to which the program is adopted?*

In keeping with the findings outlined in Brown and Brandon (2015) completion rates, student enrollment and other related factors varied considerably between participating UTeach institutions. Table 16 includes site-specific data, sorted by completion 2 rate (highest to lowest). Student factors shown to have moderate associations with program completion were included in Table 16 for comparison across sites.

In sites with five participating cohorts, Western Kentucky University (WKU) had the highest overall completion rate (33%), but was tenth in terms of number of first course enrollments and 50% of enrolled students dropped out after one course. Analyses of student factors indicated a moderate positive correlation between Completion 2 and number of participating mathematics majors which ranged from 55% to 4%. The site with the lowest number of math majors was University of California, Berkeley (UCB) with 4%. UCB also had the second highest number of first course enrollments (424), the largest



percentage of students (81%) dropping out after one course, and the lowest average number of courses taken per student (1.73).

Table 16: Summary of Key Participation Patterns and Student Factors by Site

Site ID	University	Students (N)	Completion 2 (%)	One Course Only (%)	Number of Cohorts (max 5)	Univ. GPA (M)	UTeach Courses Total (M)	Math Major (%)
55	University of Texas at Tyler	46	57	24	1	3.22	7.00	33
62	Western Kentucky University	241	33	50	5	3.10	4.90	28
71	Cleveland State University	60	32	30	1	3.06	4.48	55
16	University of North Texas	314	30	46	5	2.84	4.37	53
65	University of Kansas	389	29	55	5	3.07	4.31	21
34	Temple University	167	26	70	5	3.10	4.15	16
86	Northern Arizona University	306	25	62	5	2.89	3.89	29
82	Florida State University	290	20	63	5	2.99	3.65	25
22	University of Texas at Dallas	280	19	57	5	3.13	3.77	16
63	University of Colorado, Colorado Springs	16	19	73	1	3.18	3.31	50
67	University of Tennessee, Knoxville	61	18	65	1	3.16	3.57	31
69	Louisiana State University	441	18	62	5	3.17	3.17	19
31	University of Florida	225	17	72	5	3.41	2.90	24
35	University of Colorado, Boulder	389	15	56	5	3.19	2.53	21
87	University of Houston	383	14	59	5	2.60	3.27	27
44	University of California, Irvine	199	12	70	5	3.02	2.81	23
57	University of Tennessee, Chattanooga	29	10	35	1	2.91	3.28	29
11	University of Texas at Arlington	90	9	48	1	2.78	2.86	10
28	Middle Tennessee State University	49	6	57	1	2.96	3.10	26
15	University of California, Berkeley	424	4	81	5	3.32	1.73	4
47	University of Memphis	21	0	56	1	2.80	2.86	24

As reported above, we looked at pre-college performance indicators (ACT/SAT math scores), actual university performance levels (GPA), and UTeach completion rates across the total sample. Overall, university performance levels (GPA) had positive relationships with both completion rates, but neither correlation was especially large which indicates that the measure will not be a strong factor in predicting successful completion of the UTeach program. A one-way ANOVA revealed significant differences in university GPA between study sites, $F(20, 4,015) = 18.524, p < .001$. Schools with the top five highest student GPAs were sites 31, 15, 55, 35, and 63 (all above 3.17). In terms of completion rates, however, only one of these sites was in the top five sites for completion (site 55). Also



notable is that college GPA was above 3.0 for 62% of the sites with the lowest average GPA 2.6 (Site 87).

Additional analyses could be conducted based on institutional features such as size of university, or membership in a particular education system (University of California, for example). All of the universities included in the sample are public institutions, but the educational emphases and priorities within the schools may be different and impact program participation.

DISCUSSION & CONCLUSIONS

The analyses described in this report expanded on prior work reported by Brown and Brandon (2015) which included enrollment and graduation data from two cohorts of replication sites as well as information on the number of students entering and remaining in the teaching profession. We included data from sites with cohorts that began the UTeach program in either fall 2008, spring 2009, fall 2009, spring 2010 or fall 2010 (a subset of the 25 UTeach cohort groups who have participated in UTeach to date). Thirteen sites had students in the UTeach program for all five possible cohorts. In the fall 2010 cohort, there were an additional eight sites participating. In keeping with prior findings, there was a significant decrease in program participation after the first course (55.4% attrition) and again after the second (28.27% attrition). Of the 4,420 students in the study sample, only 859 completed the program using criteria for Completion 2 (students completed the student teaching requirement).

To explore program implementation, enrollment and persistence, we looked at the number of UTeach courses students enrolled in at each site. We found considerable variation in average number of courses taken at each site with a maximum of 7+/- 3.41 and a minimum of 1.73 +/-1.8. Across the whole sample, 44.4% of students took only one course before dropping out of the program and the overall average course number was 3.45 +/- 3.21. For the thirteen sites participating in all five cohorts, the average number of courses taken was 3.41 +/- 3.19.

We calculated completion variables using different criteria and compared findings across sites and cohorts. Using Completion 1 (9 or more courses), 659 students completed the UTeach program overall (a 14.9% completion rate). Using Completion 2 (students took the student teaching component), 859 of the 4,420 students in the sample (19.4%) completed the program. Between sites there was a great deal of variation in completion rates which ranged from 0.9% to 52.2% for Completion 1 and 0% to 57% for Completion 2. These data underscore the lack of uniformity in the course sequences and show we must be cautious in defining success only by number of courses taken; doing so appears to under-estimate the



number of students who are persisting to the student teaching component of UTeach. Completion rates were relatively consistent across cohorts ranging from 20.36% (fall 2009) to 18.6 % (fall 2010). And using Completion 2, the average number of courses taken was 9.08 +/- 1.28.

We explored the impact of length of program participation (number of cohorts) on site-specific retention measured by completion rate (1 and 2) and in all but one case there were no significant trends across cohorts. At the University of Kansas, Completion 2 rates declined across the five cohorts beginning at 40% and ending at 18%. Total student enrollment numbers also varied across the cohorts, in some cases doubling or tripling between one cohort and the next. This fluctuation may have impacted the participating school site's ability to adjust and provide adequate support to all students within the program.

Student demographic characteristics were examined to identify factors which might impact the likelihood of program persistence and completion. As expected (given the UTeach mission), most students in the program were undergraduate-degree seeking STEM majors. Completion rates were moderately correlated with university GPA as well as SAT or ACT score. Given that there is typically a lot of variation in GPA between different sites, a better way to compare student UTeach outcomes would be to use a within-school rank, or some other measure which would allow a more accurate comparison of student achievement.

We also found a significant association between ethnicity and program completion, with more white students than were expected given the initial distribution, completing the program. Conversely, in all other ethnicity categories, fewer than expected completion rates were seen. Students who were pursuing a math degree were more likely to complete the UTeach program than students pursuing other majors (STEM and non-STEM), although again the effect was not large.

Preliminary analyses on students participating at the new HHMI sites revealed similar drop off patterns between course 1 and course 2 as in the larger sample; of the 202 students who enrolled in a first UTeach course (at an HHMI site, in cohort 24), 54.45% did not enroll in a second course, compared to 55.6% in the larger sample included in this report.

Future analyses will continue to investigate and identify factors that may impact the likelihood of program continuation, program graduation, and subsequent employment in STEM teaching professions. These include regression analyses to determine which student factors best predict likelihood of completing the UTeach program, as well as entrance into STEM teaching, and persistence in the teaching field. Follow up analyses could be also conducted to examine institutional features (such as the size of university, or membership in a particular education system) which may have an impact on program participation and



persistence. Exploring student-reported reasons for dropping out of the program as well as reasons for persisting, both within the program and in the teaching profession may also help shape recruitment and retention strategies across all sites. With such a consistently high attrition rate seen in all sites, there may be ways to better focus recruitment into the program on students more likely to persist and enter the field of STEM teaching—thereby realizing the objective of the UTeach program.



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APPENDICES

Appendix A

Data on the number of students at each site taking between 1-14 courses are shown in Table A1.

Table A1: Total number of UTeach Courses by site

Site	Total Number of UTeach Courses														Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
11	35	28	8	1	3	2	5	0	4	4	0	0	0	0	90
15	325	44	15	3	1	11	14	7	1	2	1	0	0	0	424
16	98	41	21	20	18	14	19	24	44	10	5	0	0	0	314
22	109	39	32	12	11	7	13	12	18	22	2	2	1	0	280
28	21	10	5	3	1	2	2	1	0	2	1	0	0	1	49
31	123	29	18	9	6	4	5	4	10	17	0	0	0	0	225
34	71	14	14	11	7	4	1	5	6	26	8	0	0	0	167
35	191	108	16	10	5	8	16	16	14	4	1	0	0	0	389
44	111	43	16	2	2	0	2	0	0	0	3	11	9	0	199
47	9	3	2	2	3	0	1	0	1	0	0	0	0	0	21
55	4	4	2	3	4	2	0	3	5	18	1	0	0	0	46
57	7	10	2	4	2	0	0	1	2	1	0	0	0	0	29
62	70	28	20	10	7	9	13	13	41	29	1	0	0	0	241
63	8	2	2	0	0	1	0	0	1	2	0	0	0	0	16
65	132	48	37	18	12	14	13	23	76	13	3	0	0	0	389
67	26	6	8	3	4	2	0	2	4	6	0	0	0	0	61
69	198	82	40	23	6	9	6	16	42	19	0	0	0	0	441
71	13	14	4	4	3	1	7	5	5	1	1	2	0	0	60
82	123	45	20	19	7	4	8	8	30	25	1	0	0	0	290
86	123	43	28	16	8	6	2	18	29	30	1	1	0	1	306
87	165	54	47	17	18	10	16	18	21	12	4	1	0	0	383
	1962	695	357	190	128	110	143	176	354	243	33	17	10	2	4420



Appendix B

Tables B1 through B4 contain term cohort-specific completion rates results further stratified by the participating school sites. It should be noted that within the following tables there are instances where no students met the defined completion criteria, resulting in completion rates of 0. To identify the schools with the highest performance rates, we compared completion rates across all participating school sites within a specific term cohort.

Table B1: Completion percentages for cohort 4 (Fall 2008) by site

Site ID	Site Name	Total Students (N)	% Completion 1 (N)	% Completion 2 (N)
15	University of California, Berkeley	57	0.00 (0)	1.75 (1)
31	University of Florida	40	10.00 (4)	20.00 (8)
16	University of North Texas	54	12.96 (7)	31.48 (17)
87	University of Houston	67	16.42 (11)	16.42 (11)
22	University of Texas at Dallas	46	2.17 (1)	6.52 (3)
86	Northern Arizona University	47	23.40 (11)	23.40 (11)
34	Temple University	21	23.81 (5)	23.81 (5)
82	Florida State University	41	24.39 (10)	24.39 (10)
65	University of Kansas	84	28.57 (24)	40.48 (34)
44	University of California, Irvine	30	3.33 (1)	3.33 (1)
62	Western Kentucky University	29	41.38 (12)	41.38 (12)
35	University of Colorado, Boulder	51	5.88 (3)	7.84 (4)
69	Louisiana State University	16	6.25 (1)	6.25 (1)

Table B2: Completion percentages for cohort 6 (Spring 2009) by site

Site ID	Site Name	Total Students (N)	% Completion 1 (N)	% Completion 2 (N)
15	University of California, Berkeley	76	2.63 (2)	6.58 (5)
16	University of North Texas	38	36.84 (14)	36.84 (14)
22	University of Texas at Dallas	28	21.43 (6)	21.43 (6)
31	University of Florida	37	13.51 (5)	27.03 (10)
34	Temple University	42	23.81 (10)	26.19 (11)
35	University of Colorado, Boulder	46	10.87 (5)	23.91 (11)
44	University of California, Irvine	33	6.06 (2)	6.06 (2)
62	Western Kentucky University	14	50.00 (7)	50.00 (7)
65	University of Kansas	44	25.00 (11)	31.82 (14)
69	Louisiana State University	112	12.50 (14)	13.39 (15)



82	Florida State University	39	15.38 (6)	15.38 (6)
86	Northern Arizona University	28	21.43 (6)	25.00 (7)
87	University of Houston	51	11.76 (6)	11.76 (6)

Table B3: Completion percentages for cohort 8 (Fall 2009) by site

Site ID	Site Name	Total Students (N)	% Completion 1 (N)	% Completion 2 (N)
15	University of California, Berkeley	81	0.00 (0)	4.94 (4)
16	University of North Texas	91	25.27 (23)	35.16 (32)
22	University of Texas at Dallas	66	15.15 (10)	19.70 (13)
31	University of Florida	38	10.53 (4)	13.16 (5)
34	Temple University	26	38.46 (10)	38.46 (10)
35	University of Colorado, Boulder	97	6.19 (6)	13.40 (13)
44	University of California, Irvine	31	12.90 (4)	12.90 (4)
62	Western Kentucky University	72	29.17 (21)	30.56 (22)
65	University of Kansas	86	25.58 (22)	27.91 (24)
69	Louisiana State University	123	17.07 (21)	18.70 (23)
82	Florida State University	70	20.00 (14)	18.57 (13)
86	Northern Arizona University	59	27.12 (16)	35.59 (21)
87	University of Houston	98	7.14 (7)	7.14 (7)

Table B4: Completion percentages for cohort 10 (Spring 2010) by site

Site ID	Site Name	Total Students (N)	% Completion 1 (N)	% Completion 2 (N)
15	University of California, Berkeley	101	1.98 (2)	4.95 (5)
16	University of North Texas	39	17.95 (7)	28.21 (11)
22	University of Texas at Dallas	25	16.00 (4)	20.00 (5)
31	University of Florida	42	14.29 (6)	14.29 (6)
34	Temple University	27	29.63 (8)	29.63 (8)
35	University of Colorado, Boulder	96	4.17 (4)	10.42 (10)
44	University of California, Irvine	59	11.86 (7)	11.86 (7)
62	Western Kentucky University	45	28.89 (13)	37.78 (17)
65	University of Kansas	69	27.54 (19)	33.33 (23)
69	Louisiana State University	68	23.53 (16)	25.00 (17)
82	Florida State University	57	22.81 (13)	24.56 (14)
86	Northern Arizona University	75	17.33 (13)	20.00 (15)
87	University of Houston	54	12.96 (7)	16.67 (9)



Table B5: Completion percentages for cohort 11 (Fall 2010) by site

Site ID	Site Name	Total Students (N)	% Completion 1 (N)	% Completion 2 (N)	Number of Cohorts in which site participated
11	University of Texas at Arlington	90	8.89 (8)	8.89 (8)	1
15	University of California, Berkeley	109	0.00 (0)	3.67 (4)	5
16	University of North Texas	92	8.70 (8)	21.74 (20)	5
22	University of Texas at Dallas	115	20.87 (24)	23.48 (27)	5
28	Middle Tennessee State University	49	8.16 (4)	6.12 (3)	1
31	University of Florida	68	11.76 (8)	13.24 (9)	5
34	Temple University	51	13.73 (7)	17.65 (9)	5
35	University of Colorado, Boulder	99	1.01 (1)	19.19 (19)	5
44	University of California, Irvine	46	19.57 (9)	19.57 (9)	5
47	University of Memphis	21	4.76 (1)	0.00 (0)	1
55	University of Texas at Tyler	46	52.17 (24)	56.52 (26)	1
57	University of Tennessee, Chattanooga	29	10.34 (3)	10.34 (3)	1
62	Western Kentucky University	81	22.22 (18)	27.16 (22)	5
63	University of Colorado, Colorado Springs	16	18.75 (3)	18.75 (3)	1
65	University of Kansas	106	15.09 (16)	17.92 (19)	5
67	University of Tennessee, Knoxville	61	16.39 (10)	18.03 (11)	1
69	Louisiana State University	122	7.38 (9)	18.03 (22)	5
71	Cleveland State University	60	15.00 (9)	31.67 (19)	1
82	Florida State University	83	15.66 (13)	19.28 (16)	5
86	Northern Arizona University	97	16.49 (16)	21.65 (21)	5
87	University of Houston	113	6.19 (7)	16.81 (19)	5



Appendix C

Table C1: Completion rates across all cohorts by site

Site ID	Site Name	Term Cohort	Total Students (N)	% Completion 1 (N)	% Completion 2 (N)
15	University of California, Berkeley	4	57	0.00 (0)	1.75 (1)
		6	76	2.63 (2)	6.58 (5)
		8	81	0.00 (0)	4.94 (4)
		10	101	1.98 (2)	4.95 (5)
		11	109	0.00 (0)	3.67 (4)
16	University of North Texas	4	54	12.96 (7)	31.48 (17)
		6	38	36.84 (14)	36.84 (14)
		8	91	25.27 (23)	35.16 (32)
		10	39	17.95 (7)	28.21 (11)
		11	92	8.70 (8)	21.74 (20)
22	University of Texas at Dallas	4	46	2.17 (1)	6.52 (3)
		6	28	21.43 (6)	21.43 (6)
		8	66	15.15 (10)	19.70 (13)
		10	25	16.00 (4)	20.00 (5)
		11	115	20.87 (24)	23.48 (27)
31	University of Florida	4	40	10.00 (4)	20.00 (8)
		6	37	13.51 (5)	27.03 (10)
		8	38	10.53 (4)	13.16 (5)
		10	42	14.29 (6)	14.29 (6)
		11	68	11.76 (8)	13.24 (9)
34	Temple University	4	21	23.81 (5)	23.81 (5)
		6	42	23.81 (10)	26.19 (11)
		8	26	38.46 (10)	38.46 (10)
		10	27	29.63 (8)	29.63 (8)
		11	51	13.73 (7)	17.65 (9)
35	University of Colorado, Boulder	4	51	5.88 (3)	7.84 (4)
		6	46	10.87 (5)	23.91 (11)
		8	97	6.19 (6)	13.40 (13)
		10	96	4.17 (4)	10.42 (10)
		11	99	1.01 (1)	19.19 (19)
44	University of California, Irvine	4	30	3.33 (1)	3.33 (1)
		6	33	6.06 (2)	6.06 (2)
		8	31	12.90 (4)	12.90 (4)
		10	59	11.86 (7)	11.86 (7)



		11	46	19.57 (9)	19.57 (9)
62	Western Kentucky University	4	29	41.38 (12)	41.38 (12)
		6	14	50.00 (7)	50.00 (7)
		8	72	29.17 (21)	30.56 (22)
		10	45	28.89 (13)	37.78 (17)
		11	81	22.22 (18)	27.16 (22)
65	University of Kansas	4	84	28.57 (24)	40.48 (34)
		6	44	25.00 (11)	31.82 (14)
		8	86	25.58 (22)	27.91 (24)
		10	69	27.54 (19)	33.33 (23)
		11	106	15.09 (16)	17.92 (19)
69	Louisiana State University	4	16	6.25 (1)	6.25 (1)
		6	112	12.50 (14)	13.39 (15)
		8	123	17.07 (21)	18.70 (23)
		10	68	23.53 (16)	25.00 (17)
		11	122	7.38 (9)	18.03 (22)
82	Florida State University	4	41	24.39 (10)	24.39 (10)
		6	39	15.38 (6)	15.38 (6)
		8	70	20.00 (14)	18.57 (13)
		10	57	22.81 (13)	24.56 (14)
		11	83	15.66 (13)	19.28 (16)
86	Northern Arizona University	4	47	23.40 (11)	23.40 (11)
		6	28	21.43 (6)	25.00 (7)
		8	59	27.12 (16)	35.59 (21)
		10	75	17.33 (13)	20.00 (15)
		11	97	16.49 (16)	21.65 (21)
87	University of Houston	4	67	16.42 (11)	16.42 (11)
		6	51	11.76 (6)	11.76 (6)
		8	98	7.14 (7)	7.14 (7)
		10	54	12.96 (7)	16.67 (9)
		11	113	6.19 (7)	16.81 (19)



Appendix D

Table D1: Pre-college performance indicators by site

Site ID	Total (N)	ACT Math (M)	ACT Math (SD)	ACT Math (N)	SAT Math (M)	SAT Math (SD)	SAT Math (N)
11	90	22.41	3.514	41	6.03	1.665	71
15	424	28.77	5.112	44	8.61	2.094	111
16	314	23.76	3.966	84	7.03	1.707	151
22	280	28.57	4.070	115	8.26	1.617	219
28	49	22.02	3.986	45	4.50	1.291	4
31	225	27.92	3.810	105	8.54	1.646	167
34	167				7.26	1.569	156
35	389	26.80	4.176	319	7.68	1.606	217
44	199	27.30	3.981	67	7.78	1.556	163
47	21	20.37	4.500	19	5.00		1
55	46	23.79	3.881	19	5.83	2.093	18
57	29	22.41	4.326	27	5.50	2.646	4
62	241	23.89	4.940	196	6.50	2.121	2
63	16	25.38	4.445	13	7.00	2.828	2
65	389	26.20	4.089	307	7.98	1.713	93
67	61	25.43	4.306	56	7.08	1.564	12
69	441	25.61	3.990	409	8.05	1.638	20
71	60	25.38	5.114	24	7.09	1.921	11
82	290	26.16	3.524	227	7.49	1.274	259
86	306	24.11	3.903	132	6.57	1.631	165
87	383	22.63	4.105	102	6.47	1.655	238



Table D2: GPA breakdown by site

Site ID	Univ. GPA (N)	Univ. GPA (M)	Univ. GPA (SD)
11	86	2.78	0.717
15*	152	3.32	0.507
16	307	2.84	0.752
22	275	3.13	0.732
28	45	2.96	0.719
31*	207	3.41	0.500
34	165	3.10	0.580
35*	384	3.19	0.550
44	186	3.02	0.543
47	21	2.80	0.687
55*	46	3.22	0.510
57	29	2.91	0.544
62	231	3.10	0.778
63*	14	3.18	0.775
65	382	3.07	0.649
67	60	3.16	0.629
69	421	3.17	0.626
71	58	3.06	0.643
82	289	2.99	0.633
86	298	2.89	0.744
87	380	2.60	0.807

