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An Examination of Recruitment and Retention of UTeach Program Candidates

MAY 2019

Whitney Cade | Feng Liu | Michael Vaden-Kiernan | Melissa Dodson

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Prepared for:

The National Math and Science Initiative

1000 Thomas Jefferson Street NW
Washington, DC 20007-3835
202.403.5000

www.air.org

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I. BACKGROUND

According to UTeach administrators, the adoption of the UTeach program has led to a dramatic increase in the number of science, technology, engineering, and mathematics (STEM) majors enrolling in education courses and graduating with teacher certification in STEM disciplines. Administrators estimate that the 46 UTeach programs across the country will graduate more than 8,000 teachers by 2023. Further, they report that 90% of UTeach graduates enter the teaching profession, and of those, roughly 80% are retained after five years (UTeach Institute, 2017).

Not only does the program show promise in producing more teachers, research indicates that UTeach teachers also may be more effective than the average teacher. In a recent study in Texas (Backes, Goldhaber, Cade, Sullivan, & Dodson, 2018), researchers compared UTeach teachers to all other teachers in the state—including those trained through other standard university-based programs and alternative certification programs—and found significant differences in student performance on mathematics and science examinations. Students of UTeach teachers outperformed their counterparts in mathematics and science assessments by the equivalent of two months to four months of additional learning. These results are supported by another study in Texas (Marder & Hamrock, 2016), which found that students of UTeach teachers gained approximately nine months of schooling in both Algebra I and biology for gifted students and approximately five months of schooling in biology for economically disadvantaged and Hispanic students.

There are several plausible explanations for why universities with UTeach programs produce greater numbers of STEM teacher candidates compared with other university-based teacher preparation programs and why these graduates tend to be more effective than the average teacher. UTeach incorporates several program features that distinguish it from other, more traditional teacher preparation programs. Unique program features include: (1) early exposure to the classroom as part of two tuition-free courses (Step 1 and Step 2) with no commitments to teach; (2) compact degree plans that allow most students to graduate with both a STEM degree and teacher certification in four years; (3) pedagogy courses taught by faculty who are actively engaged in research in mathematics and science; (4) field-based courses taught by highly experienced public school mathematics and science teachers who serve as master teachers; (5) an array of student benefits such as paid internships; and (6) a highly structured student teaching experience with multiple observations and reflective practice. Our interest in this study focuses on UTeach's recruitment and program retention strategies, and specifically on the program's ability to recruit and retain STEM majors who otherwise would not consider teaching as a potential career path.

UTeach Recruitment

Undergraduate STEM majors are recruited by colleges of natural sciences faculties into the UTeach program as early as their freshman year and with no selection criteria upon entry. The program offers compact and flexible degree plans that allow students majoring in STEM to complete their degrees and certifications in four years. In addition, UTeach provides interested undergraduates with two 1-credit-hour, field-based courses free of charge, allowing undergraduates to experiment with teaching before they commit to completing the teaching option. In contrast, traditional teacher preparation programs typically require STEM majors to formally apply to their programs, usually offered by colleges of education, after completing the STEM content courses required for their majors. Students in these traditional programs must have a certain standing (e.g., applicants must be college juniors or seniors) and must fulfill specific criteria (e.g., minimum SAT or ACT scores, minimum GPA, prerequisite coursework) before formal acceptance.

Role of UTeach Step 1 and Step 2 Field-Based Courses in Program Retention and Completion

Given the nature of UTeach's Step 1 and Step 2 courses—tuition-free introductory field courses that expose students to teaching—retention in the program is often low following the Step courses. This is an expected and potentially beneficial outcome because STEM majors can make well-informed decisions regarding their fit in the teaching profession prior to investing substantial preparation time and resources. By design, students who choose to continue to the next set of UTeach courses do so with increased interest and commitment and with a greater chance of completing the program and becoming a teacher. In contrast, teacher candidates in more traditional teacher preparation programs have met highly selective criteria and may be more committed to completing the program upon formal entrance, but traditional programs may graduate fewer candidates overall.

UTeach Teacher Candidates

The key to UTeach's increased production of teachers may be the wide net it casts in recruiting for the Step courses, potentially tapping into a group of students who are not often recruited. Using the free Step courses, UTeach captures two types of students:

- A group of students who enter the university with the intent of becoming school teachers (equivalent to preservice teachers in other teacher preparation programs). The Step courses give students in that category opportunities to test their commitment in the context of real-world teaching experience. For some students, this experience confirms their decision to pursue a teaching career. Others may voluntarily leave the program after they realize that teaching is not what they expected and decide to pursue other career options. **In this report, we refer to these students as "G1" or "G1 (intent)."**

- A group of students who enter the university with no intention of becoming school teachers. These students may enroll in the courses because of its financial incentives or for other reasons. Like the G1 (intent) students, these students are exposed to real-world teaching experiences that may either confirm their belief that teaching is not a viable career choice or that may convince them that teaching represents a desirable career option. It is these students who often remain untapped in traditional teaching programs. **In this report, we refer to these students as "G2" or "G2 (no intent)."**

This recruitment strategy may explain the unusually large cohort of STEM majors enrolling in the UTeach program, as well as the unusually large number of students who exit the program. As seen in Figure 1, we hypothesize that Step 1 serves as a "screener" for the UTeach teacher preparation program by acting to sort students into two groups (i.e., those who pursue the program to completion and those who eventually leave the program). Absent this type of screening, it is hypothesized that many teacher candidates will leave the program during its later stages, after they have invested substantial time and resources into what, in retrospect, was a poor career decision.

Figure 1. Theory of Change: Role of UTeach Step Courses in Program Retention and Completion

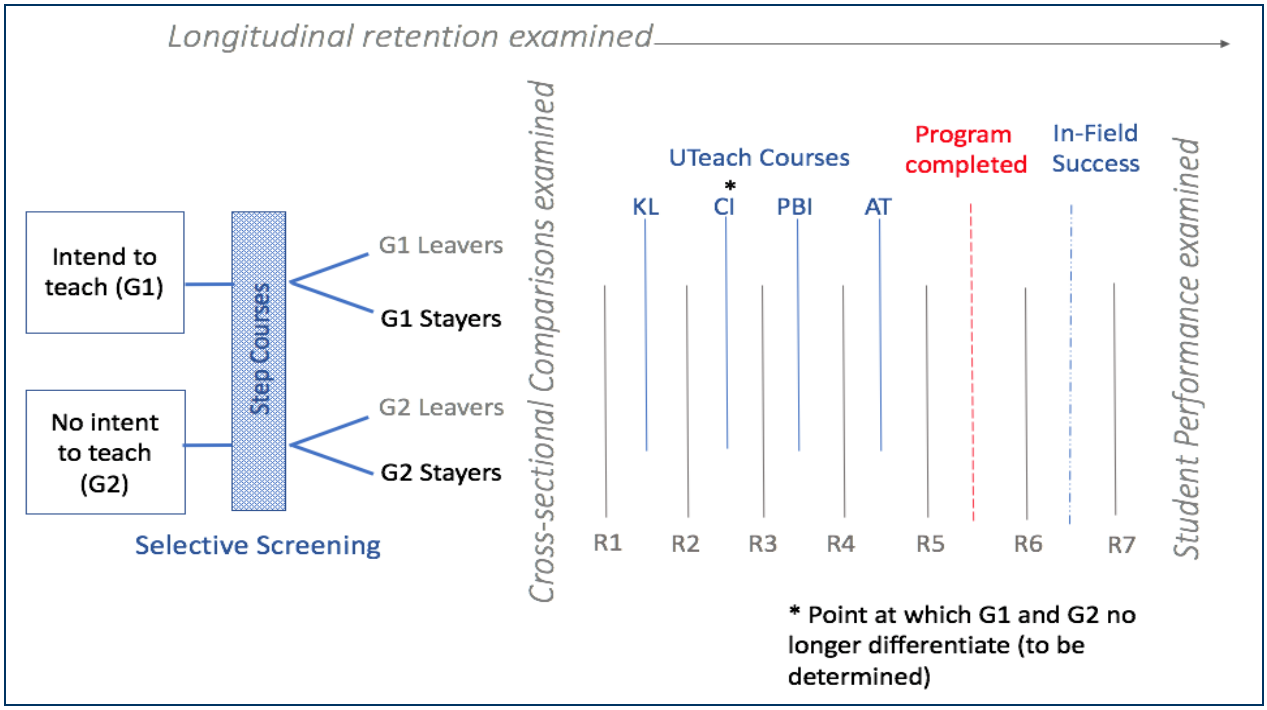

Figure 1 shows a possible course sequence for students in the UTeach program.[1] For the Step courses to effectively add value, G2 (no intent) students must quickly become as committed or more committed than the G1 (intent) students to teaching as measured, in part, by their retention in and successful completion of the program. That is, if too many students pass through the Step courses but do not subsequently complete the program, the courses may not be critical in recruiting more students than a standard university teacher preparation program.

Understanding Differences Between G1 and G2 Students

Simply examining attrition rates of G1 (intent) or G2 (no intent) students, however, will not help the program understand these students, their perceptions of the program and teaching, and how these perceptions may change as students complete the UTeach program sequence. To better understand these two groups of students, then, we examined both enrollment data and survey data gathered by UTeach upon completion of the first Step course ("entrance survey") and at the completion of the UTeach program ("end-of-program survey"). The entrance survey includes an item that defines UTeach teacher candidates as G1 (intent) or G2 (no intent) based upon their responses to "Do you plan on teaching in a school?"[2] Both surveys also inquire about students' perceptions of several important factors that may explain their motivations for staying in or leaving the program.

We posit that there are four issues captured by these surveys that may help us to understand the differences between G1 (intent) and G2 (no intent) students and their completion of the program. These issues include: (1) perceptions of the importance of program financial incentives, (2) perceptions of the program, (3) concerns about teaching practices, and (4) perceptions of teaching as a career. How teacher candidates feel about the teaching program and about teaching as a career may signal their overall satisfaction with the process of becoming teachers and how they envision a future career in teaching. There may be important distinctions between G1 (intent) and G2 (no intent) students relative to these four issues that will help us understand the needs of each group. In addition, it is possible that G1 (intent) and G2 (no intent) students may differ in their perceptions at the outset of the program but may converge upon similar perceptions by the time they complete the program.

[1] KL is "Knowing and Learning," CI is "Classroom Interactions," PBI is "Project-Based Instruction," and AT is "Apprentice Teaching." Perspectives and Research Methods are not pictured here; although required, they are not considered "core" courses because they may be taken at any time after Step 1 and Step 2. Typically, students are encouraged to take the other courses in sequence.

[2] Depending on the year, the question was also phrased as, "Do you plan on teaching STEM (Science Technology Engineering Math) middle or high school classes?" or "Do you plan on teaching Science, Engineering, Mathematics, or Computer Science (STEM) middle or high school classes?"

II. RESEARCH QUESTIONS

This report describes a study of over 1,600 entering students and over 300 students at the end of the program from seven UTeach partners in Texas with the goal of examining potential differences in teacher candidate recruitment and retention in UTeach, perceptions of the UTeach program, and perceptions of teaching as a potential career.

The study investigated the following research questions:

1. What type of students enroll in Step 1 (or Step 1/2 combination course[3])? How many students does UTeach recruit who otherwise might not enroll in a teacher preparation program?
2. How effective is the Step 1 course at sorting G1 (intent) and G2 (no intent) students into "stayers" and "leavers"? At what point, if any, do G1 (intent) and G2 (no intent) students no longer differentiate in terms of program retention?
3. What are teacher candidates' perceptions of UTeach financial incentives, the program, teaching practices, and teaching as a profession, and are there differences in these perceptions between G1 (intent) and G2 (no intent) students? To what degree do these perceptions change between entrance and completion of the program?
4. Do G1 (intent) and G2 (no intent) teachers differ in their placement, retention, and quality after completing the UTeach program?

III. DATA, SAMPLE, AND METHODS

Data

This study's primary data sources are student entrance and end-of-program survey data received from the UTeach Institute at The University of Texas at Austin in February 2019 for the years 2011–2018. Each survey contained encrypted student IDs that allowed the research team to link students across years and to link survey data to course enrollment data.

Samples

Our study used two samples. The first examined group differences in student perceptions in the entrance survey. The second sample examined longitudinal group differences in student perceptions in the end-of-program survey as well as differences between entrance and end-of-program surveys.

[3] Throughout the remainder of this report, we refer to "Step 1" as the first course, but we also consider and analyze the Step 1/2 combination course similarly.

Sample for entrance survey analysis

The sample of students who took the entrance survey between 2011 and 2018 included 1,623 students from the seven UTeach partners. Most participants were female (66%), had a major of science[4] (41%) or mathematics (25%), and had previous teaching experience[5] (81%). Thirty-two percent of students were White, 45% were Hispanic, 16% were Asian, and 5% were Black/African American.

Sample for combined entrance and end-of-program survey analysis

To examine research question 3 related to perceptions of UTeach, we explored differences in the end-of-program survey and changes between entrance and end-of-program surveys for G1 (intent) and G2 (no intent) candidates, which included 328 students from the seven UTeach partners who completed both entrance and end-of-program surveys. Most participants in this smaller subsample were female (71%), had a major of science[6] (35%) or mathematics (38%), and came into the program with previous teaching experience (86%). Forty-five percent of students who completed the program were White, 34% were Hispanic, 16% were Asian, and 4% were Black/African American.

Analyses

To address the first research question related to types of students enrolled, we calculated a Chi-Square test of independence to compare G1 (intent) and G2 (no intent) groups to determine whether the two types of students differ in demographic terms. To examine research question 2 related to retention in the program, we explored the differences between G1 (intent) and G2 (no intent) groups relative to program retention using a logistic regression model for binary outcomes (e.g., whether students remained in the program). We included a group fixed effect and program fixed effects, and we controlled for student-level characteristics in the model. For more details about our analytic approach for this and all other analyses, see Appendix A.

To address research question 3 (perceptions of UTeach), we examined differences between G1 (intent) and G2 (no intent) students in their perceptions of the UTeach program in the entrance survey using a two-level hierarchical linear model (HLM), in which students (level 1) were nested within UTeach programs (level 2) to account for the nesting data structure. We employed a cumulative logit model to measure group differences for the outcomes with ordinal distribution when the survey response categories were ordered (e.g., not important, somewhat

[4] "Science" includes Astronomy, Biochemistry, Biology, Chemistry, Geosciences and Physics. We collapsed these majors to make one category, but all other majors are not collapsed.

[5] Previous teaching experience was indicated by the students on the survey when asked to mark the kinds of experiences they had had with teaching, ranging from experience in a K–12 classroom to tutoring friends and family. We considered any of these to be previous experience.

[6] This includes Astronomy, Biology, Chemistry, Geosciences and Physics.

important, very important). We included a group fixed effect (i.e., G1 or G2) and controlled for student-level characteristics (e.g., gender, race/ethnicity, had/did not have teaching experience) and program-level characteristics (e.g., program enrollment, percent female students, percent White students, percent Hispanic students, and percent students with teaching experience) in the model.

We also examined the end-of-program survey results using a one-level cumulative logit model to investigate differences between G1 (no intent) and G2 (no intent) students in their perceptions of UTeach program. We included a group fixed effect and program fixed effects, and we controlled for student-level characteristics in the model.

Finally, to further investigate research question 3 (perceptions of UTeach), we analyzed differences in perceptions between the entrance and end-of-program surveys using a Wilcoxon signed-rank test[7] to compare student responses between the two surveys.

IV. RESULTS

Research Question 1: What Type of Students Enroll in Step 1? How Many Students Does UTeach Recruit Who Otherwise Might Not Enroll in a Teacher Preparation Program?

Of the 1,623 students who had taken the entrance survey after completing Step 1, approximately 40% indicated that they did not intend to pursue a teaching career, placing them in group G2 (no intent). This confirms claims by UTeach that the program does recruit a sizeable quantity of STEM majors who typically would not consider teaching professionally.

To address research question 1 (student enrollment), we used a Chi-Square test of independence to determine whether the G1 (intent) and G2 (no intent) students differ with respect to their demographics (see Table 1 for test results). In terms of gender, we found no differences between G1 (intent) and G2 (no intent) candidates. In addition, there were no significant differences between the groups in terms of the percentage of White and Black/African American students. However, G1 (intent) students were significantly more likely to be Hispanic (48.0%) than G2 (no intent) students (40.6%) and less likely to be Asian (10.9%) than G2 (no intent) students (22.9%). G1 (intent) students were found to be more likely to have teaching experience (84.3%) than G2 (no intent) students (75.0%). G1 (intent) students were more likely to major in Mathematics (31.8%) and Education (3.7%) than G2 (no intent) students

[7] The Wilcoxon signed-rank test is a nonparametric statistical hypothesis test alternative to the paired *t*-test used to compare paired data. The Wilcoxon test is used when the data are not normally distributed, such as in student survey responses with ordinal distribution.

(14.8% in Mathematics and 0.9% in Education), while G2 (no intent) students are more likely to major in Science (46.5%), Engineering (5.5%), and Computer Science (3.3%) than G1 (intent) students (37.7% in Science, 2.7% in Engineering, and 0.8% in Computer Science).

Table 1. Student Demographics in Entrance Survey

	G1	G2	Chi-Square	*p*-value
Female	64.2%	67.5%	1.60	0.206
White	33.8%	29.4%	3.18	0.075
Black/African American	4.9%	5.1%	0.01	0.922
Hispanic	48.0%	40.6%	7.72	0.005
Asian	10.9%	22.9%	39.59	0.000
Have teaching experience	84.3%	75.0%	20.83	0.000
Mathematics major	31.8%	14.8%	58.28	0.000
Science major	37.7%	46.5%	11.88	0.001
Engineering major	2.7%	5.5%	7.52	0.006
Education major	3.7%	0.9%	10.58	0.001
Computer science major	0.8%	3.3%	11.84	0.001

The differences between these groups indicate that allowing students to test their interest and commitment in the context of Step courses may be successfully capturing a different group of STEM students and diversifying the general student-teacher-candidate pool. Although G1 (intent) students are more likely to have previous teaching experience, 75% of G2 (no intent) students have previous teaching experience, suggesting that UTeach may be attractive to both G1 (intent) and G2 (no intent) students who have previously taught in some capacity.

Research Question 2: How Effective Is Step 1 at Sorting G1 and G2 Students into Stayers and Leavers? At What Point Do G1 and G2 Students No Longer Differentiate in Terms of Program Retention?

To better understand the Step courses as a filtering strategy, we examined trends in program retention between G1 and G2 students. Table 2 shows the proportion of G1 and G2 students who remained (i.e., were retained) in the program immediately after Step 1 (i.e., enrolled in at least one more course after the first course they took). The analysis shows that G1 (intent) students were more likely to remain in the program after Step 1 than G2 (no intent) students, and the difference was statistically significant. This is expected considering their initial

motivation to become teachers. However, about half of G2 (no intent) students were still retained at this point, indicating that the course was able to convince almost half the students to continue in the program.

Table 2. Program Retention After Step 1

Group	Retention Rate	*N*	G1 Versus G2	
			Odds Ratio (G2/G1)	*p*-value
G1	79.6%	627	0.19	0.000
G2	49.2%	465		

Note. Odds ratio is the ratio of the odds of retention between G2 and G1 students.

Our study explored whether these groups of students differed in terms of later course taking. To determine this, we examined student program retention rates after taking the remaining four "core" courses, including *Step 2*, *Knowing and Learning*, *Classroom Interactions,* and *Project-Based Instruction.*[8] The data indicate that G1 (intent) students were more likely to remain in the program than G2 (no intent) students after taking *Step 2*, *Knowing and Learning* and *Classroom Interactions*, and the differences were significantly significant (see Table 3). No difference was found between G1 (intent) and G2 (no intent) students after the course *Project-Based Instruction*. Moreover, the program retention rate for both groups progressively increased as students completed each course in sequence, and differences between G1 (intent) and G2 (no intent) were essentially convergent at the point of the *Project-Based Instruction* course. These findings may be helpful in determining the point in the program when G1 (intent) and G2 (no intent) are equivalent in their rates of program retention, and this point is comparable to other teacher preparation programs' entrance points.

Table 3. Program Retention After Core Courses

Course Title	Group	Retention Rate	*N*	G1 Versus G2	
				Odds Ratio (G2/G1)	*p*-value
2. Step 2	G1	77.3%	485	0.32	0.000
	G2	61.0%	228		
3. Knowing and Learning	G1	82.8%	437	0.57	0.027

[8] Apprentice Teaching is also considered a core course, but because it is intended to be the last course taken by a student prior to completing the program, examining program retention after Apprentice Teaching is nearly equivalent to program completion.

Course Title	Group	Retention Rate	*N*	G1 Versus G2	
				Odds Ratio (G2/G1)	*p*-value
	G2	75.9%	162		
4. Classroom Interactions	G1	86.0%	350	0.50	0.034
	G2	80.2%	116		
5. Project-Based Instruction	G1	90.6%	234	0.90	0.845
	G2	90.3%	62		

In terms of program completion, Table 4 shows the proportion of students who completed the program relative to those who remained in the program after Step 1. More than half of G1 (intent) students and about one third of G2 (no intent) students completed the program. We found that G1 (intent) students were more likely to complete the program than G2 (no intent) students, and the difference was statistically significant.

Table 4. Program Completion Rates After Step 1 for Each Group

Group	Completion Rate	*N*	Odds Ratio (G2/G1)	*p*-value
G1	50.7%	499	0.35	0.000
G2	30.1%	229		

We also found that 22% of all students who finished the program were G2 (no intent) students. Because UTeach is designed to be "exploratory," this is an expected result, but it nevertheless suggests that the program allows both groups of students to make well-informed decisions about teaching as a career option and is successful at increasing the diversity of graduates completing the program with the addition of G2 (no intent) students.

Research Question 3: What Are Teacher Candidates' Perceptions of UTeach Financial Incentives, the Program, Teaching Practices, and Teaching as a Profession? To What Degree Do These Perceptions Change Between Entrance and Completion of the Program?

Another goal of the study was to examine whether there were differences between G1 (intent) and G2 (no intent) students in terms of their perceptions of the program and how they envisioned teaching as a possible career option; understanding students' perceptions may give us insight into why some G2 (no intent) students stayed in the program.

Differences in financial incentives

To understand the importance of the financial incentives offered by the program, we analyzed the student responses around the importance of program-sponsored internships and other program-sponsored financial incentives or support in their decisions to remain in the UTeach program at the time of the entrance survey. As illustrated in Table 5, the majority of students responded that financial support was somewhat to very important. G2 (no intent) students were more likely to think *Other Program-Sponsored Financial Incentives or Support* was important than G1 (intent) students in their decisions to remain in or to leave the program, and the difference was significant at the trend level $p < .10$.

Table 5. Perception of Financial Incentives, Entrance Survey

Support	Group	Not Important	Somewhat Important	Very Important	*N*	Odds Ratio (G2/G1)	*p*-value
Program-sponsored internships	G1	21.1%	40.0%	38.8%	407	1.12	0.510
	G2	20.2%	40.4%	39.3%	183		
Other program-sponsored financial incentives or support	G1	19.8%	38.9%	41.3%	409	1.44	0.052
	G2	17.9%	34.2%	47.8%	184		

Note. "Odds ratio" is the ratio of the odds of selecting a higher category option in the order of *Not Important*, *Somewhat Important,* and *Very Important* between G2 and G1 students.

Table 6 shows G1 (intent) and G2 (no intent) students' perceptions of program-sponsored incentives and supports (e.g., internships)[9] on the end-of-program survey. Similar to the entrance survey, the majority of students responded that UTeach's incentives and supports were somewhat to very important in their decision to remain in (and, presumably, to complete) the program, and the groups did not differ in this perception. These findings indicate that the financial incentives offered by UTeach may be important factors in retaining students.

Table 6. Perception of Financial Incentives, End-of-Program Survey

Support	Group	Not Important	Somewhat Important	Very Important	*N*	Odds Ratio (G2/G1)	*p*-value
Program-sponsored incentives and supports (e.g., internships)	G1	29.6%	32.7%	37.6%	226	0.79	0.382
	G2	38.4%	31.5%	30.1%	73		

[9] Two items on the entrance survey and one item on the end-of-program survey concerned the importance of program-sponsored incentives relative to students' decisions to remain in the UTeach program.

Differences in program satisfaction

The study also explored students' perceptions of UTeach. Table 7 illustrates student satisfaction with the UTeach program on the entrance survey. During Step 1, the majority of students were satisfied with the program. G1 (intent) students were significantly more satisfied with the program than G2 (no intent) students.

Table 7. Satisfaction with the Program, Entrance Survey

Group	Dissatisfied	Neutral	Satisfied	*N*	Odds Ratio (G2/G1)	*p*-value
G1	3.2%	6.1%	90.7%	971	0.38	0.000
G2	4.1%	17.2%	78.7%	639		

Note. Odds ratio is the ratio of the odds of selecting a higher category option in the order of *Dissatisfied*, *Neutral* and *Satisfied* between G2 and G1 students.

By the time students took the end-of-program survey, most G1 (intent) students and all G2 (no intent) students rated the program satisfactorily (see Table 8).

Table 8. Satisfaction With the Program, End-of-Program Survey

Group	Dissatisfied	Neutral	Satisfied	*N*	Odds Ratio (G2/G1)	*p*-value
G1	4.1%	4.1%	91.9%	74	NA	
G2	0.0%	0.0%	100.0%	14		

Respondents to the end-of-program survey also rated their satisfaction with several aspects of the program, including *program staff support, degree plan flexibility, access to resources and materials,* and *space available for collaborating*. Across the board, a large majority of respondents rated these aspects of the program satisfactorily (see Table 9), and no differences were found between G1 (intent) and G2 (no intent) students.

Table 9. Satisfaction with the Program

Aspect	Group	Dissatisfied	Neutral	Satisfied	*N*	Odds Ratio (G2/G1)	*p*-value
Program staff support	G1	0.0%	2.2%	97.8%	180	0.65	0.630
	G2	1.7%	1.7%	96.6%	59		
Degree plan flexibility	G1	3.4%	18.0%	78.7%	178	1.65	0.252
	G2	1.7%	13.6%	84.7%	59		

Aspect	Group	Dissatisfied	Neutral	Satisfied	*N*	Odds Ratio (G2/G1)	*p*-value
Access to resources and materials needed for teaching	G1	0.6%	2.8%	96.7%	180	2.02	0.521
	G2	0.0%	1.7%	98.3%	59		
Space available for collaborating, practicing lessons, etc.	G1	1.7%	7.8%	90.6%	180	1.00	0.999
	G2	0.0%	11.9%	88.1%	59		

Differences in perceptions of practice of teaching

The UTeach program is designed to elucidate whether teaching is a viable option for teacher candidates to pursue. This involves alleviating any concerns teacher candidates may have about specific teaching practices. Teacher candidates may have concerns about whether they know the content well enough to make it meaningful to their students and whether they can ensure their students understand the content well enough to apply it properly. They may have concerns related to classroom management and providing students with an environment that allows for critical and creative thinking and collaboration. Candidates may have concerns about specific strategies such as using assessment data and technology in the classroom. And they may have concerns relative to the school climate, and specifically to working with school administrators and parents. To better understand these concerns, we examined UTeach teacher candidates' responses to items on the entrance survey and the end-of-program survey to determine if differences existed between G1 (intent) and G2 (no intent) students.

We found an identical group of 10 items that address students' concerns on both the entrance and end-of-program surveys. We further grouped these items into four categories of concern as shown in Table 10. These categories included: (1) content knowledge, (2) classroom management, (3) instructional strategies, and (4) school climate.

Table 10. Concerns Related to Teaching Practice Items

Category	Item
Content	Knowing my content well enough to make it meaningful to my students
	Ensuring the students understand the content well enough to apply it properly
Classroom management	Dealing with students' behavior issues
	Creating an environment that supports both individual and collaborative learning
	Engaging students in critical/creative thinking and collaboration
	Understanding and recognizing the strengths and needs of individual students

Category	Item
School climate	Working with school administration
	Working with parents
Instructional strategies	Using assessment data to guide planning and instruction
	Using technology in the classroom

To begin, we examined the 10 items as a single construct—overall level of concern—and found no significant differences on the entrance survey between G1 (intent) and G2 (no intent) students relative to overall level of concern (Table 11). To further investigate these results, the evaluation team then examined the 10 items individually as shown in Appendix B, Table B1. No differences were found between G1 (intent) and G2 (no intent) students on any of the 10 items, indicating that the two groups did not initially differ in their individual concerns or in their overall levels of concern with teaching.

Table 11. Overall Level of Concern Related to Teaching Practice, Entrance Survey

Group	Adjusted Mean	Standard Deviation	*N*	Estimate (Standard Error)	*p*-value
G1	4.26	0.95	970	-0.03 (0.05)	0.552
G2	4.23	0.78	628		

The evaluation team then repeated this examination with the end-of-program survey and, again, found no significant overall difference between G1 (intent) and G2 (no intent) students in their levels of concern (Table 12). The evaluation team also examined the concerns individually in the end-of-program survey but, again, found no significant differences on these items (see Table B2 in Appendix B).

Table 12. Overall Level of Concern Related to Teaching Practice, End-of-Program Survey

Group	Adjusted Mean	Standard Deviation	*N*	Estimate (Standard Error)	*p*-value
G1	3.85	1.02	242	0.06 (0.14)	0.684
G2	3.91	1.06	73		

Because the same questions were asked on both the entrance and exit surveys, we also were able to look at the *change* in students' concerns about teaching practices from the beginning to the end of the program. We knew that G1 (intent) and G2 (no intent) students did not differ

from one another in their concerns at the beginning and end of the program, but it was possible that the change over time within a group was significant.

To investigate the change in students' teaching practice concerns, the evaluation examined the items pertaining to concern in the entrance and end-of-program survey for those who completed both surveys. The results are shown in Table B3 in Appendix B. Both G1 (intent) and G2 (no intent) students were less concerned at the time of the end-of-program survey than at the beginning of the program about issues related to content and one issue related to classroom management (*Creating an environment that supports both individual and collaborative learning*). G1 (intent) students also were less concerned at the end-of-program survey than at the entrance survey about two additional issues related to classroom management: *Engaging students in critical/creative thinking and collaboration* and *Understanding and recognizing the strengths and needs of individual students*, and one issue related to instructional strategies: *Using assessment data to guide planning and instruction*. These differences were all statistically significant.

Difference in perceptions of teaching career

The study also explored students' concerns about pursuing a career in teaching, which could potentially relate to recruitment and completion of the UTeach program. In particular, we were interested in understanding whether G2 (no intent) students had different concerns about becoming a teacher than G1 (intent) students and whether participation in the program changed these concerns over time. UTeach students rated their concerns about the teaching profession on the four issues related to pursuing a teaching career (see Table 13). On the entrance survey, G2 (no intent) students were significantly more concerned about two issues, *Career path/advancement* and *Salary*, than G1 (intent) students. In addition, G2 (no intent) students were more concerned about the *Prestige/perception of the teaching profession* than G1 (intent) students, and the difference was marginally statistically significant.

Table 13. Concerns Related to Pursuing a Teaching Career Between G1 and G2, Entrance Survey

Issues	Group	Not concerned	Concerned	*N*	Odds Ratio (G2/G1)	*p*-value
Additional time and/or cost to obtain degree	G1	56.5%	43.5%	976	0.81	0.100
	G2	67.6%	32.4%	642		
Career path/advancement	G1	52.0%	48.0%	976	1.43	0.002
	G2	48.6%	51.4%	642		

Issues	Group	Not concerned	Concerned	*N*	Odds Ratio (G2/G1)	*p*-value
Prestige/perception of the teaching profession	G1	64.6%	35.4%	975	1.25	0.077
	G2	65.1%	34.9%	642		
Salary	G1	39.0%	61.0%	976	1.61	0.000
	G2	33.0%	67.0%	640		

Table 14 shows student concerns about the four issues among students who completed both the entrance and end-of-program surveys.[10] The results show that both G1 (intent) and G2 (no intent) students were significantly more concerned about the four issues when they completed the program than at the time of the entrance survey, with the exception of G2 (no intent) students' concern about *Additional time and/or cost to obtain a degree* (likely due to the low number of respondents, which limited the statistical power to detect any difference). The greatest concern of students (with more than 70% of students selecting "yes" on the end-of-program survey) was related to *Salary*. It also appears that 75% of G2 (no intent) students reported concerns about *Career path/advancement* on the end-of-program survey.

Table 14. Concerns Related to Pursuing a Teaching Career on Entrance and End-of-Program (EOP) Surveys

Issue	Group Type	Survey	No	Yes	*N*	*p*-value
Additional time and/or cost to obtain degree	G1	Entrance	71.7%	28.3%	46	0.004
		EOP	41.3%	58.7%		
	G2	Entrance	80.0%	20.0%	10	0.129
		EOP	40.0%	60.0%		
Career path/advancement	G1	Entrance	59.6%	40.4%	225	0.000
		EOP	34.2%	65.8%		
	G2	Entrance	56.9%	43.1%	72	0.000
		EOP	25.0%	75.0%		
Prestige/perception of the	G1	Entrance	74.8%	25.2%	226	0.000

[10] An analysis also was conducted to examine differences between G1 (intent) and G2 (no intent) students regarding their concerns about pursuing a teaching career on the end-of-program survey. No difference was found between the two groups of students relative to their concerns about the four issues.

Issue	Group Type	Survey	No	Yes	*N*	*p*-value
teaching profession		EOP	46.9%	53.1%		
	G2	Entrance	72.6%	27.4%	73	0.001
		EOP	43.8%	56.2%		
Salary	G1	Entrance	44.0%	56.0%	225	0.000
		EOP	28.9%	71.1%		
	G2	Entrance	45.2%	54.8%	73	0.020
		EOP	27.4%	72.6%		

As mentioned previously, both groups increased concerns over time. It may be that, as students become more committed, more invested, and more aware of the challenges teachers face, concerns about the profession become more real and remarkable.

Research Question 4. Do G1 and G2 Teachers Differ in Their Placement, Retention, and Quality?

To address this question, we needed to connect the survey data (which contains students' G1 (intent) and G2 (no intent) status) with state classroom records available at the Texas Education Research Center (ERC). Integrating new data sets into the ERC requires that the data have personally identifiable information, which is sent to the Texas Education Agency (TEA). TEA then strips out this identifying information and replaces it with a set of identifiers that link directly to existing state records.

The American Institutes for Research (AIR) study team asked partnering UTeach universities to help us tag their survey data with identifiable information. The UTeach Institute gave each university site a crosswalk of student survey IDs and students' UTeach ID numbers, to which the universities added student names, birth dates, and Social Security/TEA Login (TEAL) IDs. This data was then sent directly to TEA in company with the survey data and did not pass through the AIR team's hands to maintain participant anonymity and confidentiality.

Following the month-long deidentification process, AIR was notified that the files were ready for analysis. Unfortunately, upon merging this data with our dataset of recently active (since 2012) Texas secondary school STEM teachers, we found an insufficient number of identified teachers with a G1 or G2 status to conduct the analysis to address this research question. First, we found that only 925 of 7,735 UTeach students had been given TEA IDs, probably a result of universities and UTeach programs keeping incomplete records of students' personal information. This greatly reduced our opportunity to build an adequate sample size, since we

knew that only 21% of UTeach students took the entrance survey. When merging the survey data into our dataset of teachers and students, we found that only 150 mathematics teacher and 75 science teachers merged, and of those, only 29 and 20, respectively, had G1/G2 indicators from the entrance survey. Of these small numbers of teachers with a G1/G2 status, only one mathematics teacher and three science teachers were identified as G2 (no intent). This is because, while 40% of *recruited* students were G2 (no intent), students in the G2 (no intent) category made up only 22% of students who completed the program. In addition, G2 students were more likely to be science majors, which accounted for the low number of G2 (no intent) mathematics teachers in our sample. Therefore, the combination of low identification rates and response rates on the entrance survey resulted in very low numbers of teachers with G1/G2 statuses.

With so few G2 (no intent) teachers identified, it was impossible to conduct further analyses. First and foremost, any analyses contrasting G1 (intent) and G2 (no intent) teachers would be extremely prone to bias because there only four G2 (no intent) teachers were identified. No interpretable outcomes would have resulted from these analyses, and any attempt to generalize the results would probably have been erroneous. Results produced at the ERC, moreover, are reviewed by ERC staff prior to their release for "small cells," or analyses which result in small groups of people which could lead to their identification. For most analyses, the threshold for small cells is five people, meaning that we would be in violation of the rules of the ERC if we reported any results relative to G2 (no intent) teachers.

Based on our experience with attempting to gather, merge, and analyze the survey data with state records, we learned a number of valuable lessons and we have developed recommendations to make this process successful in the future.

First, to make the process viable, UTeach would need to increase the entrance survey response rate to achieve a better match to state records and to the end-of-program survey. This would improve the generalizability of the results presented in this report and also the ability to connect this data to other records.

Second, each UTeach site may want to work with their Registrar's Office to identify a system for maintaining records of personally identifiable information for the students who enter the UTeach program. In the context of this study, for example, we had 1,623 student entrance surveys available for identification, but of these, fewer than 278 students were given linkable information. If UTeach wishes to locate the program's teachers in state records, staff may want to explore how best to access those records easily in partnership with the university.

For ease of analysis, we also recommend that the Institute try to maintain the wording on items from year-to-year. With several changes in wording, linking surveys over time is difficult when questions and wording changes may lead students to understand the question differently.

V. SUMMARY

The goal of this study was to examine UTeach's recruitment and program retention strategies, specifically its ability to recruit and retain STEM majors who otherwise would not consider teaching as a potential career choice. The results of this study shed light on the value and importance of several unique UTeach features that may explain why the program has been successful at increasing the number of effective STEM teachers.

This study found that:

- UTeach successfully recruits a potentially untapped population of STEM majors. Approximately 40% of UTeach students in the program's Step 1 course are G2 (no intent). Approximately 30% of G2 (no intent) students continue in the UTeach program after completing the Step 1 course. These students are an "add-on" to the usual population that other, more traditional programs may produce and a nod to the value of the Step courses.
- UTeach recruitment diversifies the student population. In our study, a greater proportion of G1 (intent) students were Hispanic and majored in Mathematics and Education than G2 (no intent) students. More G2 (no intent) students were Asian and majored in the sciences, computer science, and engineering. G1 students were more likely to have previous teaching experience, but 75% of G2 (no intent) students also had previous teaching experience, suggesting that both groups shared an initial base of practical teaching knowledge.
- G1 (intent) students were more likely to be retained in the program than were G2 (no intent) students. Over time, however, retention rates among both groups tended to converge and, by the time students had completed *Project-Based Instruction*, there was no significant difference in retention between the two groups. This may be a point in the program when the UTeach student population can confidently be compared to students in other teacher preparation programs in terms of GPA, SAT scores, and other teacher preparation entrance criteria.
- Financial incentives were popular with both groups of students. The majority of students reported that program-sponsored financial incentives or support were somewhat to very important upon program entrance and completion. This finding may help UTeach administrators to determine the cost-benefit of student financial support.

- The UTeach program was viewed positively by both groups of students. An overwhelming majority of UTeach students rated the program as satisfactory; this was true across multiple aspects of the program including *program staff support, degree plan flexibility, access to resources and materials,* and *space available for collaborating and practicing lessons.* G1 (intent) students tended to be more satisfied than G2 (no intent) students after Step 1, but there were no differences between the groups at program completion.
- Overall, G1 (intent) and G2 (no intent) students did not differ in their overall level of concern about teaching practices or school environment, and any concerns they reported had decreased slightly by the end of the program. We believe this shows that UTeach prepared its students such that their fears about day-to-day teaching practices decreased over time. Going forward, more could be done to ensure that concerns among G2 (no intent) students are addressed, given that concerns among those students did not diminish at the same rate as G1 (intent) students do in the areas of classroom management and using assessment data.
- UTeach students were concerned about making a career of teaching, specifically about the *additional time and/or cost to obtain the degree, career path/advancement, prestige/perception of the teaching profession*, and *salary*. Overall, these concerns increased over the course of the program. Going forward, UTeach administrators may want to consider ways to alleviate these concerns, particularly as students reach completion of the program.

There are several limitations that should be considered alongside these findings. First, not every student who passed through or completed the UTeach program took both entrance and end-of-program surveys. We estimate that roughly one of five students who took one UTeach course completed the entrance survey. This means that the entrance survey, in particular, may have been prone to response bias.

Second, the entrance survey often was not administered in the same semester as the student's first UTeach course. In later years, this survey was administered annually in the spring; thus, it was completed in the semester following Step 1 for students who took Step 1 in the fall. Consequently, G1/G2 designations were sometimes made after at least one full UTeach course had been taken. Our estimates of the number of G2 (no intent) students may have been conservative, then, because with additional UTeach experience, students may have changed their minds about teaching and self-reported at G1 (intent) in the spring. To overcome this problem and the program's low survey response rate, one idea would be to administer a smaller survey to students early in Step 1 (perhaps even during class) to target information that UTeach wants to know about their initial pool of students.

Finally, we found that very few students who pass through the UTeach program take both the entrance and end-of-program surveys (328 of 7,735 students, or 4.2%). This means that some survey results should be interpreted cautiously as they are based on a potentially biased group of students.

That said, UTeach programs can be relatively confident that their Step courses, financial incentives, and program supports are valuable recruitment and program-retention strategies. Current and future funders of UTeach have some evidence that their financial support of these strategies represents a good investment. In addition, policymakers can better understand the UTeach program, specifically when to begin measuring variables of selectivity of program candidates (i.e., SAT, GPA, and prerequisite courses required) for purposes of higher education accountability.

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Appendix A. Analytic Approach

Appendix A describes the analytic approach we followed to examine UTeach's entrance and end-of-program survey and student program retention data as we addressed research questions 1–3.

Analysis of Student Retention and Program Completion

To examine the group difference between G1 (intent) and G2 (no intent) categories in terms of program retention and completion after Step 1, we employed a logistic regression model to measure group differences for the binary outcomes (e.g., whether the student remains in the program). The model is presented in equation (1):

$$Y_i = \beta_0 + \beta_{GrpDiff} Group_i + \beta_{Term} Term_i + x1_i' \beta_{StuCov} + x2_i' \beta_{Program} + \varepsilon_i \quad (1)$$

In this model, for student retention outcome, Y_i represents the odds of remaining in the program for student *i*; for program completion outcome, Y_i represents the odds of program completion for student *i*. $Group_i$ is the group status (i.e., G1/G2) of student *i*, and $Term_i$ is the term when student *i* started the program. The vector $x1_i'$ represents student-level characteristics (e.g., gender, race/ethnicity, whether they have any teaching experience), the vector $x2_i'$ represents a set of programs to eliminate bias in the estimate attributed to program differences, and ε_i is the error term. The coefficient β_0 shows the average outcome of G1 (intent) students. The coefficient $\beta_{GrpDiff}$ represents the estimated difference between G1 (intent) and G2 (no intent) students in the outcome of interest.

Analysis of Student Perceptions in Entrance Survey

To examine the differences between G1 (intent) and G2 (no intent) students in their perception of the UTeach program at the time of the entrance survey, we used a two-level HLM, in which students (level 1) were nested within university programs (level 2) to account for the nested data structure. We employed a cumulative logit model to measure group differences for the outcomes with an ordinal distribution. The two-level cumulative logit model is presented in equation (2):

$$Y_{ij} = \beta_0 + \beta_{GrpDiff} Group_{ij} + \beta_{Year} Year_{ij} + x1_{ij}' \beta_{StuCov} + x2_j' \beta_{SchCov} + \nu_j + \varepsilon_{ij} \quad (2)$$

In this model, Y_{ij} represents the outcome of interest (e.g., the probability that the student response falls at or below a particular option such as somewhat important when answering questions related to student concern on issues regarding the pursuit of a teaching career) for student i in program j, $Group_{ij}$ is the group status of student i in program j, and $Year_{ij}$ is the year when student i took the entrance survey. The vector $x1_{ij}'$ represents student-level

characteristics as shown above. The vector $x2_j'$ represents program-level characteristics (e.g., program enrollment, percent female, the percent of students who are White, the percent of students who are Hispanic, and the percent of students with teaching experience). A random effect v_j is included to account for covariance of outcomes among observations of students from the same program, and ε_{ij} is the error term. The coefficient β_0 shows the average probability that G1 students' response falls at or below a particular option. $\beta_{GrpDiff}$ represents the estimated difference between G1 (intent) and G2 (no intent) students in the probability that their responses fall at or below a particular response option.

In addition to the examination of group differences using the cumulative logit model for the 10 items related to the construct Concerns Related to Teaching Practices, the analysis team also scaled the responses to these items using a Rasch model for ordered response categories (Andrich, 1978; Rasch, 1980; Wright & Masters, 1982). The scale score produced by the Rasch model provide a quantitative view of the frequency and intensity of respondents' answers across a set of items representing a given construct. We employed a generalized linear model instead of a cumulative logit model, which can be represented with the same equation shown above in (2) to examine the group difference for the scale score between G1 (intent) and G2 (no intent) groups.

Analysis of Student Perceptions in the End-of-Program Survey

The evaluation team used a multiple regression model (equation (3) to examine the difference between G1 (intent) and G2 (no intent) students in their perceptions of the UTeach program at the time of the end-of-program survey for those who completed the program. To measure group differences for the survey response outcomes with ordinal distributions, we employed a cumulative logit model; to measure the group difference for the overall construct (i.e., Concerns Related to Teaching Practices) scale score generated using a Rasch model, we employed a generalized linear model.

$$Y_i = \beta_0 + \beta_{GrpDiff} Group_i + \beta_{Year} Year_i + x1_i'\beta_{StuCov} + x2_i'\beta_{Program} + \varepsilon_i \quad (3)$$

In this model, for survey response outcomes, Y_i represents the probability that student response falls at or below a particular option such as somewhat important for student i; for scale score outcome, Y_i represents the scale score for student i. $Group_i$, vectors $x1_i'$ and $x2_i'$ have the same notion as those in equation (1). $Year_i$ is the year when student i took the end-of-program survey, and ε_i is the error term. The coefficient $\beta_{GrpDiff}$ represents the estimated difference between G1 (intent) and G2 (no intent) students in the outcome of interest.

Appendix B. Concerns Related to Teaching Practice Items—Analysis Results

Table B1. Concerns Related to Teaching Practice, Entrance Survey, G1 and G2

Item	Group	1	2	3	4	5	6	7	*N*	Odds Ratio (G2/G1)	*p*-value
Content											
Knowing my content well enough to make it meaningful to my students	G1	8.9%	7.5%	10.2%	12.1%	14.3%	12.7%	34.3%	932	1.03	0.753
	G2	8.3%	8.0%	10.3%	11.6%	16.1%	16.3%	29.3%	601		
Ensuring the students understand the content well enough to apply it properly	G1	4.6%	7.1%	10.6%	11.8%	14.7%	18.6%	32.6%	952	0.98	0.853
	G2	3.9%	6.0%	11.0%	12.3%	16.2%	23.2%	27.4%	617		
Classroom management											
Dealing with students' behavior issues	G1	6.8%	10.4%	14.6%	14.5%	20.5%	16.0%	17.2%	938	0.92	0.424
	G2	7.7%	7.9%	13.3%	20.7%	19.6%	16.0%	14.8%	608		
Creating an environment that supports both individual and collaborative learning	G1	7.4%	8.2%	10.9%	13.3%	15.8%	17.3%	27.1%	930	1.00	0.981
	G2	6.1%	5.7%	12.5%	15.6%	18.7%	20.5%	21.0%	610		
Engaging students in critical/creative thinking and collaboration	G1	8.9%	7.8%	9.9%	13.9%	16.0%	17.6%	25.9%	937	1.04	0.689
	G2	5.9%	7.4%	10.2%	16.1%	18.5%	19.3%	22.6%	607		
Understanding and recognizing the strengths and needs of individual students	G1	9.0%	9.8%	11.0%	14.3%	14.3%	15.0%	26.7%	938	0.94	0.503
	G2	7.4%	9.5%	12.6%	15.2%	18.5%	15.8%	21.1%	612		
School climate											
Working with school administration	G1	13.7%	13.0%	13.0%	16.6%	15.3%	14.7%	13.6%	868	0.93	0.490
	G2	12.4%	15.4%	15.5%	17.1%	15.9%	12.6%	11.2%	573		
Working with parents	G1	12.6%	13.1%	13.7%	15.6%	15.1%	14.8%	15.1%	890	0.97	0.737
	G2	12.0%	13.3%	12.7%	18.9%	16.5%	14.2%	12.4%	565		
Instructional strategies											
Using assessment data to guide planning and instruction	G1	9.9%	10.3%	13.5%	18.2%	16.8%	14.9%	16.4%	919	0.98	0.846
	G2	8.4%	8.9%	15.1%	21.3%	19.6%	14.1%	12.7%	597		

Item	Group	1	2	3	4	5	6	7	*N*	Odds Ratio (G2/G1)	*p*-value
Using technology in the classroom	G1	18.5%	13.1%	12.0%	12.2%	14.2%	14.5%	15.6%	855	0.90	0.323
	G2	16.2%	15.0%	13.7%	18.1%	14.6%	10.2%	12.2%	548		

Table B2. Concerns Related to Teaching Practice, End-of-Program Survey, G1 and G2

Item	Group	1	2	3	4	5	6	7	*N*	Odds Ratio (G2/G1)	*p*-value
Content											
Knowing my content well enough to make it meaningful to my students	G1	31.0%	13.5%	9.6%	5.2%	12.2%	13.1%	15.3%	229	1.26	0.416
	G2	27.9%	14.7%	13.2%	7.4%	2.9%	16.2%	17.6%	68		
Ensuring the students understand the content well enough to apply it properly	G1	13.2%	19.1%	14.0%	9.8%	15.7%	6.8%	21.3%	235	0.89	0.661
	G2	18.3%	18.3%	8.5%	8.5%	15.5%	15.5%	15.5%	71		
Classroom management											
Dealing with students' behavior issues	G1	7.1%	8.4%	19.2%	16.7%	19.7%	9.6%	19.2%	239	1.21	0.476
	G2	5.5%	11.0%	9.6%	23.3%	12.3%	17.8%	20.5%	73		
Creating an environment that supports both individual and collaborative learning	G1	19.8%	16.4%	12.9%	8.2%	11.6%	14.2%	16.8%	232	1.02	0.947
	G2	15.7%	18.6%	11.4%	17.1%	7.1%	14.3%	15.7%	70		
Engaging students in critical/creative thinking and collaboration	G1	22.6%	19.1%	10.6%	9.4%	11.1%	11.1%	16.2%	235	1.10	0.718
	G2	17.1%	21.4%	7.1%	15.7%	8.6%	17.1%	12.9%	70		
Understanding and recognizing the strengths and needs of individual students	G1	16.2%	23.1%	11.4%	7.4%	11.4%	11.8%	18.8%	229	0.99	0.978
	G2	18.3%	16.9%	11.3%	15.5%	9.9%	15.5%	12.7%	71		
School climate											
Working with school administration	G1	13.6%	17.4%	17.4%	16.1%	12.3%	12.7%	10.6%	236	1.02	0.957
	G2	18.6%	8.6%	18.6%	17.1%	10.0%	11.4%	15.7%	70		
Working with parents	G1	11.0%	12.7%	19.5%	18.6%	12.3%	13.6%	12.3%	236	0.95	0.855
	G2	9.7%	11.1%	15.3%	20.8%	19.4%	11.1%	12.5%	72		

Item	Group	1	2	3	4	5	6	7	*N*	Odds Ratio (G2/G1)	*p*-value
Instructional strategies											
Using assessment data to guide planning and instruction	G1	25.2%	15.7%	13.5%	8.7%	12.6%	13.0%	11.3%	230	1.01	0.973
	G2	22.9%	22.9%	11.4%	15.7%	4.3%	10.0%	12.9%	70		
Using technology in the classroom	G1	29.5%	21.6%	6.2%	7.5%	12.3%	8.8%	14.1%	227	1.05	0.864
	G2	31.9%	20.3%	5.8%	11.6%	4.3%	15.9%	10.1%	69		

Table B3. Concerns Related to Teaching Practice, Entrance and End-of-Program Surveys

Item	Group Type	Survey	1	2	3	4	5	6	7	*N*	*p*-value
Content											
Knowing my content well enough to make it meaningful to my students	G1	Entrance	12.5%	11.1%	9.3%	12.5%	17.1%	11.1%	26.4%	216	0.000
		EOP	31.0%	13.4%	9.7%	5.6%	11.6%	13.4%	15.3%		
	G2	Entrance	11.9%	10.4%	6.0%	13.4%	17.9%	19.4%	20.9%	67	0.016
		EOP	28.4%	14.9%	13.4%	6.0%	3.0%	16.4%	17.9%		
Ensuring the students understand the content well enough to apply it properly	G1	Entrance	3.5%	8.8%	14.1%	10.6%	17.6%	21.1%	24.2%	227	0.000
		EOP	11.9%	18.5%	14.1%	10.1%	16.3%	7.0%	22.0%		
	G2	Entrance	5.7%	5.7%	11.4%	15.7%	11.4%	27.1%	22.9%	70	0.003
		EOP	18.6%	18.6%	8.6%	8.6%	14.3%	15.7%	15.7%		
Classroom management											
Dealing with students' behavior issues	G1	Entrance	5.7%	11.0%	15.0%	17.2%	23.3%	16.7%	11.0%	227	0.512
		EOP	7.0%	7.5%	18.9%	17.2%	19.4%	10.1%	19.8%		
	G2	Entrance	14.1%	7.0%	5.6%	18.3%	28.2%	16.9%	9.9%	71	0.367
		EOP	4.2%	11.3%	9.9%	23.9%	12.7%	18.3%	19.7%		
Creating an environment that supports both individual and collaborative learning	G1	Entrance	7.7%	10.0%	14.1%	10.9%	20.0%	19.5%	17.7%	220	0.002
		EOP	18.2%	15.9%	13.2%	8.6%	12.3%	14.5%	17.3%		
	G2	Entrance	8.8%	7.4%	14.7%	10.3%	20.6%	26.5%	11.8%	68	0.037
		EOP	16.2%	19.1%	10.3%	17.6%	5.9%	14.7%	16.2%		
Engaging students in critical/creative thinking and collaboration	G1	Entrance	10.2%	8.4%	11.6%	20.4%	16.0%	10.7%	22.7%	225	0.000
		EOP	21.3%	18.7%	10.7%	9.8%	11.6%	11.1%	16.9%		
	G2	Entrance	7.4%	7.4%	13.2%	20.6%	22.1%	17.6%	11.8%	68	0.069
		EOP	17.6%	20.6%	7.4%	16.2%	7.4%	17.6%	13.2%	68	

Item	Group Type	Survey	1	2	3	4	5	6	7	*N*	*p*-value
Understanding and recognizing the strengths and needs of individual students	G1	Entrance	9.1%	13.6%	13.6%	15.0%	17.3%	13.2%	18.2%	220	0.043
		EOP	15.5%	22.7%	11.4%	7.3%	11.4%	12.3%	19.5%		
	G2	Entrance	7.2%	15.9%	15.9%	17.4%	10.1%	15.9%	17.4%	69	0.156
		EOP	18.8%	17.4%	11.6%	14.5%	10.1%	14.5%	13.0%		
School climate											
Working with school administration	G1	Entrance	17.0%	14.6%	15.6%	16.5%	15.6%	14.2%	6.6%	212	0.517
		EOP	13.2%	17.5%	17.0%	16.0%	12.3%	13.2%	10.8%		
	G2	Entrance	10.8%	21.5%	13.8%	26.2%	9.2%	9.2%	9.2%	65	0.501
		EOP	18.5%	9.2%	18.5%	18.5%	9.2%	10.8%	15.4%		
Working with parents	G1	Entrance	10.5%	16.8%	16.4%	16.8%	15.0%	14.5%	10.0%	220	0.413
		EOP	9.5%	11.4%	19.1%	19.5%	13.2%	14.1%	13.2%		
	G2	Entrance	6.2%	21.5%	10.8%	26.2%	9.2%	18.5%	7.7%	65	0.451
		EOP	9.2%	10.8%	15.4%	23.1%	15.4%	12.3%	13.8%		
Instructional strategies											
Using assessment data to guide planning and instruction	G1	Entrance	12.6%	10.2%	14.4%	21.9%	17.7%	11.6%	11.6%	215	0.018
		EOP	24.2%	14.4%	13.5%	8.8%	13.5%	13.5%	12.1%		
	G2	Entrance	10.4%	13.4%	16.4%	17.9%	20.9%	10.4%	10.4%	67	0.068
		EOP	23.9%	23.9%	10.4%	14.9%	3.0%	10.4%	13.4%		
Using technology in the classroom	G1	Entrance	18.1%	22.1%	13.1%	12.1%	16.1%	12.1%	6.5%	199	0.976
		EOP	24.6%	22.6%	6.5%	8.5%	14.1%	9.5%	14.1%		
	G2	Entrance	17.5%	17.5%	14.3%	20.6%	12.7%	6.3%	11.1%	63	0.179
		EOP	31.7%	22.2%	6.3%	9.5%	3.2%	17.5%	9.5%		

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