# Implementing a Secondary STEM Teacher Preparation Program at Multiple Universities: The UTeach Institute's Evaluation Approach and Pilot Summative Data[1]

Alicia D. Beth, Mary Lummus-Robinson, Pamela Romero, & Martha Perez
The UTeach Institute[2], The University of Texas at Austin

---

*UTeach* is a secondary science, technology, engineering, and mathematics (STEM) teacher preparation program started in 1997 at The University of Texas at Austin (UT Austin), now being replicated by 28 universities across 14 U.S. states.

The first two universities to replicate UTeach established pilot programs in 2006. A national grant competition funded those programs and 11 others as the first cohort of universities to replicate UTeach in 2008. A second cohort of eight universities began UTeach replication in 2010, and two other cohorts – a total of seven universities – began in 2011 and 2012. Grants for the two pilot programs concluded in Spring 2011, and grants for the remaining 11 programs in Cohort 1 will conclude Spring 2012.

*The UTeach Institute* was established in 2006 to both support and evaluate UTeach implementation at universities nationwide. Current statistics on UTeach and its national replication are available at http://uteach-institute.org/publications.

## Purposes

The purposes of this paper are to share (1) the UTeach Institute's summative evaluation plan for the first group of 13 universities and (2) summative data for one of the pilot programs.

## Theoretical Framework

To promote the dual goals of fidelity to the UTeach program model and long-term sustainability of new UTeach-based programs, the UTeach Institute's approach to program replication emphasizes (a) clear articulation of program elements and expectations for replication, (b) comprehensive planning with qualified and recommended sites, (c) intensive implementation support provided by program originators, and (d) ongoing evaluations of progress (Beth, Hughes, Romero, Walker, & Dodson, 2011).

---

[1] *(2012, April). Paper presented at the annual meeting of the American Educational Research Association, Vancouver, BC. For more information, please contact Alicia Beth at abeth@austin.utexas.edu.*

[2] The UTeach Institute partners with the National Math and Science Initiative and the States of Texas, Tennessee, Georgia, Massachusetts, and Florida to replicate UTeach at universities across the country. A complete list of our strategic partners is available at http://uteach-institute.org/about/detail/strategic-partners/.

Our approach draws from the literature on program replication and adaptation (e.g., Cotner et al., 2005), fidelity of implementation (e.g., Century, Rudnick, & Freeman, 2010; Hill, Maucione, & Hood, 2007), and the long-term sustainability of innovations (e.g., Hall & Hord, 2010).

Methodologically, we are influenced by Potter (2006)'s *interpretive* evaluation framework. Our approach emphasizes, for example, the standards of *attention to stakeholders*, *negotiated purposes*, and *meaningful processes and products* identified by the Joint Committee on Standards for Educational Evaluation (Yarbrough, Shulha, Hopson, & Caruthers, 2011).

## Methods

### Operational Data Collection

All of our operational evaluation instruments (e.g., surveys, focus group protocols) are based on specific, measureable indicators that have been mapped to the unique elements and activities of the UTeach model. These *UTeach Elements of Success* are defined and available at http://uteach-institute.org/publications.

*Site Visits*

In Spring 2008, we began collecting a variety of formal baseline and program implementation data from all of the universities with which we work. Our data collection methods include site visits every semester (i.e., fall and spring), which involve interviews and focus groups with a variety of stakeholders (e.g., STEM teacher candidates in the pre-existing program, program leaders, faculty, master teachers, staff, students), other meetings (e.g., with individuals involved in fundraising for the programs), and tours of facilities. Progress toward program implementation is documented through semiannual operational summary reports following these site visits.

*Surveys*

Students and graduates are surveyed at critical points during their participation in the programs (e.g., when they leave or graduate) as well as mid-semester in all program courses. Each of these online surveys includes a common set of items to suit programmatic and evaluation needs.

*Student, Program, and University Data*

The UTeach Institute has developed a Progress Evaluation and Reporting System (PEARS) to display longitudinal data from all our university partners. University users submit data each term about their students, programs, and universities. These data are used to address important questions related to program implementation, student enrollment and retention, and teacher production and professional retention. Semiannual progress reports are drafted primarily using these quantitative data.

## Instructional Data Collection

All of our instructional evaluation activities are based on discrete course design principles, core course components, course objectives, and demonstrations of student learning outlined for each program course.

*Course Observations*

As part of our semi-annual site visits to each of the universities with which we work, we conduct course observations, with the goal of observing one class meeting of each UTeach course at least once over the four-year implementation period. These course observations are summarized using a standardized observation template.

*Interviews with Course Instructors*

We interview instructors following each course observation in order to collect data on how UTeach courses are being implemented and adapted to meet local contexts. Redacted interview data are used, in part, for the final instructional program review report created for each program at the end of its grant period.

*Reviews of Course Materials*

Instructors for each UTeach course submit course materials – including student work, instructor feedback, and other artifacts – the first time the course is offered at each university. Course experts – experienced instructors from UT Austin – then review these materials using rubrics based on the course's core components and objectives. The data from these reviews are used formatively for program improvement and summatively, along with course observation and instructor interview data, to provide a full picture of each program at the end of its grant period.

## Data Sources

Longitudinal data are collected from multiple sources throughout the course of program implementation; a full list of data sources is available upon request. Data sources used for summative evaluation include:

- Enrollment Data
    - Overall program enrollment data, by term
- Student Level Data
    - Gender
    - Ethnicity
    - University GPA
    - Majors
    - Student Classification (e.g., freshmen)
- Program Personnel Focus Group Transcripts
    - Co-directors

    - Master teachers
    - Faculty
    - Program staff
- Student Focus Group Transcripts
    - Pre-existing program students
    - Step 1 (introductory course) students, by semester
    - Students enrolled in any non-introductory course, by semester
    - Apprentice Teaching students
- Course Instructor Interview Transcripts
- Program Course Materials
    - Syllabi
    - Sample student work
    - Sample instructor feedback
    - Sample mentor teacher feedback
    - Expert reviews of course materials
- Course Observation Records
- Student Survey Data
    - Course midterm surveys, by course
    - Program graduate surveys
    - Program leaver surveys
    - Program alumni surveys
- Funding Milestone Matrices, by term
- Site Visit Narrative Summaries, per term
- Program Operations Summaries, per term
- Progress Reports, per term

## Results

### The UTeach Institute's Summative Evaluation Plan

We have developed a framework for reporting these summative evaluation data for each university. This reporting format includes:

- A high level narrative summary of the program, including program and student characteristics, outcomes, and projections of teachers produced and K-12 students taught
- A narrative summary of the program as it relates to the *UTeach Elements of Success*, including quotes from co-directors, faculty, master teachers, and students and a table reflecting field experiences throughout the UTeach course sequence
- A narrative description of university adaptations to the program model, including rationales, organized by the *UTeach Elements of Success*
- A narrative description of remaining challenges for full program implementation and sustainability, including summative recommendations

Appendices include information on:

- The UTeach Institute's approach to program replication and evaluation
- The specific state and university context, including a description of the university's secondary STEM teacher preparation activities prior to program implementation
- Implementation activities over the course of the grant period, specific to the university
- Institutional changes that have occurred as a result of program implementation
- Results of the overall instructional program review

**Pilot Summative Results**

In this section, we detail the summative results of our evaluation of one of the programs that began implementing the UTeach model in 2006. For purposes of anonymity, we refer to this program as ProgramTeach.

Universities replicating UTeach typically engage in a competitive site selection process, including preparing a comprehensive proposal that requires that they demonstrate the capacity and commitment to achieve complete program implementation. Site selection is followed by a planning period (ideally, spring and summer semesters) and four academic years of program implementation, during which program operations are established and UTeach equivalent courses are rolled out sequentially. Eleven of the 13 universities in the first cohort of universities selected to replicate UTeach began a planning period in Spring 2008 and began offering courses in Fall 2008. ProgramTeach, however, had already begun to implement courses and other components of the program in 2006.

In 2008, the university was awarded a grant from the National Math and Science Initiative to work with the UTeach Institute to further develop ProgramTeach according to the UTeach model. The UTeach Institute supported and evaluated the program through a variety of activities (described above) for three years, from Spring 2008 through Spring 2011.

*The ProgramTeach Secondary STEM Teacher Preparation Program*

ProgramTeach is an innovative teacher preparation program for undergraduate science and mathematics majors at a large comprehensive public university in the midwestern United States. As with the UTeach model, ProgramTeach allows students to earn secondary teaching certification while completing a degree in science or mathematics in approximately the same time necessary to complete an equivalent undergraduate degree *without* teaching certification.

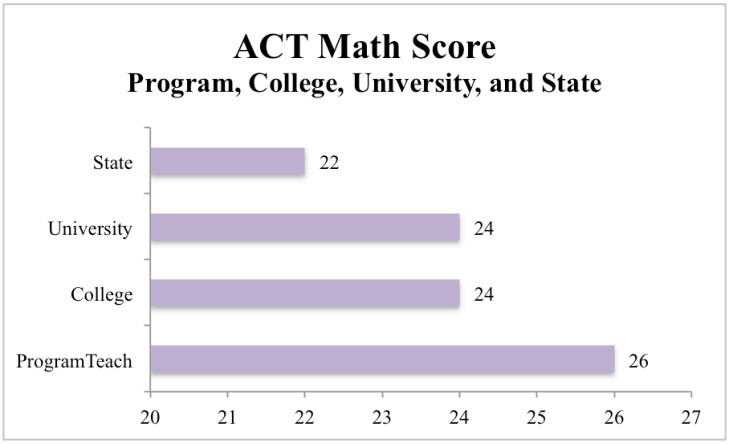
**Program enrollment and recruitment.** ProgramTeach's enrollment rose from 84 students in Fall 2008, the first semester of implementation for the purposes of our

evaluation, to 316 students in Spring 2011. ProgramTeach's enrollment is higher than the average program enrollment across the 13 universities in Cohort 1[3] (276 students).

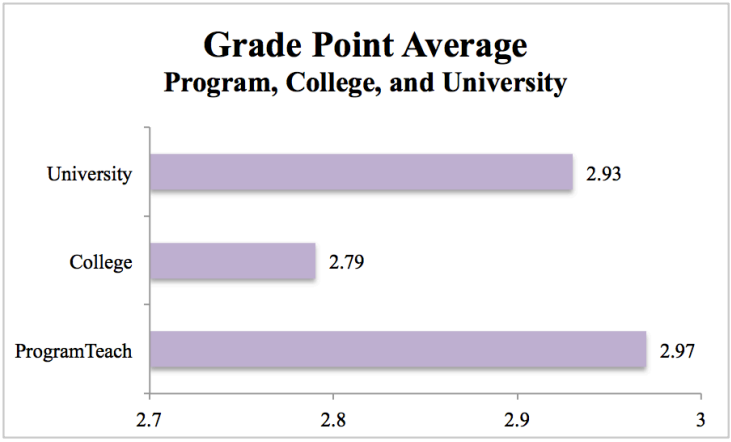
Likewise, the percentage of the university's STEM major pool recruited into the program grew from the first year of implementation, 2008-09 (3.6% of all STEM majors), to 2010-11 (5.0% of all STEM majors). By comparison, average STEM major recruitment across all universities in Cohort 1 was 3.9% during that time period.

As is common of UTeach students at UT Austin, 35% of all new ProgramTeach students in Spring 2011 reported having heard about the program from another student in the program. Other effective recruitment pathways included posters on campus (27% of all new students), three-minute recruiting talks in STEM courses (19%), and letters or emails from program staff (15%).

**Student characteristics.** As of Spring 2011, 54% of all ProgramTeach students were female, compared to 50% in the university's college of science and 49% at the university overall. By comparison, an average of 60% of all students in programs replicating UTeach as part of Cohort 1 were female. The majority (89%) of ProgramTeach students identified themselves as White. This is greater than the averages in the university's college of science (79%), the university overall (80%), or across the universities replicating UTeach as part of Cohort 1 (56%).

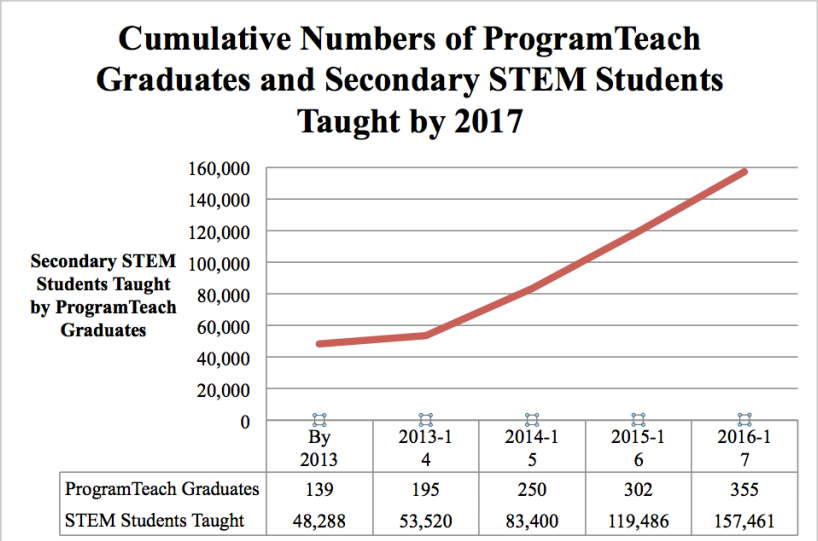



College entrance examination and grade point average data indicate that ProgramTeach students are at least as well prepared and successful as their peers in the college of science, university, and state. Additionally, as of Spring 2011, 29% of ProgramTeach graduates taking the Praxis Principles of Learning and Teaching exam scored within the top 15% of all test takers, and 45% scored within the top 15% of all test takers on their STEM content assessment.




[3] UT Austin has been excluded from all comparisons.

**Projections.** As of Spring 2011, ProgramTeach had graduated 49 students. By 2017, five years after the end of the grant period for the 13 universities in Cohort 1, the program is expected to have graduated 270 students, with a steady graduation rate of 57 students per year.[4] These graduates are expected to have taught almost 120,000 secondary STEM students by that time.




*Institutional Changes as a Result of ProgramTeach Implementation*

| Institutional Change | Prior to ProgramTeach | With ProgramTeach, Spring 2011 |
|---|---|---|
| University-Wide Collaboration to Prepare STEM Teachers | STEM teacher preparation was the sole responsibility of the college of education. Students took four years to earn a bachelor's degree in math or science education and a fifth year to earn licensure and a partial master's degree. | STEM teacher preparation is viewed as a collaboration of the colleges of science and education and the science education center, beginning with joint leadership and shared decision making. Students take content and pedagogy courses simultaneously. |
| Program Identity | Students completed requirements for teacher certification through a sequence of math or science education courses.<br><br>Additional information on the program identity or | ProgramTeach has established a local and regional identity and is represented regularly by news media. ProgramTeach is a fully articulated *program*, beyond a sequence or collection of courses, that involves a cohesive community of students, master teachers, faculty, and support staff. |

[4] Projections are based on the production and retention rates of UTeach at UT Austin, assuming, in part, that 80% of program graduates who enter teaching will remain in the profession for at least five years, teaching 150 students per year.

| Institutional Change | Prior to ProgramTeach | With ProgramTeach, Spring 2011 |
|---|---|---|
| | community surrounding the pre-existing programs is unavailable. | |
| Recruitment of STEM Majors to Try Teaching | Students were not recruited. STEM majors interested in teaching self identified and sought out information on their own from the college of education. | STEM majors are actively recruited to try teaching through a variety of activities. The program offers financial incentives and advising support to students to help them determine if teaching is something they might be interested in pursuing. |
| Degree Plans | To certify in STEM disciplines, students either entered as post-baccalaureates or completed an additional year of coursework and field experience for licensure. Degrees were awarded in science or mathematics education rather than in individual STEM disciplines. | Degree plans allow students to earn both a degree in the STEM major and teaching licensure in the same amount of time required to earn an equivalent STEM degree alone, without the time and cost of additional semesters. |
| Involvement of Master Teachers | Education faculty taught all professional development courses and supervised field experiences for student teaching. | The university hires experienced and successful master teachers with expertise in science or mathematics to teach the first two recruitment courses, Step 1 and Step 2, and to co-teach with education faculty all other courses with field experiences. Apprentice Teaching is facilitated by a master teacher. |
| Involvement of STEM Faculty | STEM faculty taught content courses independent of math or science education or professional development courses in the | In addition to content major courses, STEM faculty teach several ProgramTeach courses specially designed for STEM majors seeking secondary teaching certification. |

| Institutional Change | Prior to ProgramTeach | With ProgramTeach, Spring 2011 |
|---|---|---|
| | college of education | |
| Early, Ongoing, and Intensive Field Experiences | Students' first teaching experience occurred in the final semester, after the completion of the bachelor's degree, in the culminating Student Teaching course, during which they became full-time teachers of record.<br><br>No systematic effort was in place to put students in high-need, diverse classrooms or match them with cooperating teachers who would address their individual needs. | Field experiences, including both observations and teaching, in high-need, diverse classrooms, occur beginning in the first course, which can be taken in the first semester of a student's freshman year.<br><br>Teaching opportunities continue regularly throughout the program. Field experiences are individualized, carefully scaffolded, and intensively coached and assessed by master teachers, mentor teachers, and course instructors.<br><br>The culminating Apprentice Teaching experience is designed using a half-day model both to encourage the apprentice teacher to plan and reflect with the cooperating teacher in whose classroom he or she has been placed and to enable the student to finish the courses required for his or her STEM degree in an amount of time equivalent to that required for the degree alone. Master teachers, cooperating teachers, and university facilitators observe frequently (a minimum of 10 times) throughout the semester and provide apprentice teachers extensive feedback. Apprentice teachers are supported through a weekly seminar in which they are concurrently enrolled. |
| Integration of Content and Pedagogy | Students seeking science or mathematics licensure took education courses with all teacher candidates in all content areas and grade levels, including those with very different pedagogical needs (e.g., elementary education certifiers). | ProgramTeach students complete a streamlined, developmental course sequence specifically designed for future STEM teachers with themes of technology, equity, and assessment interwoven across courses. Courses such as Research Methods and Functions and Modeling highlight content knowledge of particular importance for STEM teachers, in addition to counting toward the content major degree plan. |

| Institutional Change | Prior to ProgramTeach | With ProgramTeach, Spring 2011 |
|---|---|---|
| Focus on Instructional Strategies | *Information on the instructional focus of the pre-existing programs is unavailable.* | Courses model and teach students how to employ a variety of instructional strategies ranging from inquiry to direct instruction, appropriate uses of technology for learning, assessment and analysis of data, and strategies for ensuring equity when working with diverse populations. Inquiry and project-based instruction are highlighted. |
| Strong Connections Between Educational Theory and Practice | Students had just one opportunity, in their final student teaching semester, to apply the theories and instructional strategies they had learned in their professional development courses. | ProgramTeach field experiences provide early and ongoing opportunities for students to implement and reflect on the instructional strategies about which they are learning in their professional development courses. Learning theory is consistently highlighted as the basis for decisions teachers make about professional practices. |
| Explicit Connections Among STEM Disciplines | Students did not systematically learn about the development of their content disciplines or about connections among and within the STEM disciplines. | ProgramTeach courses help students explore the relationships among the STEM disciplines and reflect on how content is learned in each. Mathematics and science majors take most program courses together. All students learn about the historical and philosophical development of mathematics and the sciences. |
| Rigorous, Research-Based Instruction | *Information on the emphasis of deep content knowledge in the pre-existing programs is unavailable.* | ProgramTeach courses emphasize the development of deep content understanding. For example, students experience the process by which scientists and mathematicians arrive at new knowledge and techniques through a research methods course specifically created for future STEM teachers. Research-based professional development courses address instructional strategies used to support curricular choices that best fit STEM student needs. Courses are developed and taught by faculty who are actively engaged in research in STEM or STEM education. |
| Portfolio Assessment of Students | *Information on student assessment in the pre-existing* | Students create a state required teaching portfolio that meets both program requirements and national standards for |

| Institutional Change | Prior to ProgramTeach | With ProgramTeach, Spring 2011 |
|---|---|---|
| | *programs is unavailable.* | secondary STEM teaching (e.g., NCATE). |
| Student Support | *Information on student support in the pre-existing programs is unavailable.* | Financial supports (e.g., scholarships, internships) are offered to all ProgramTeach students.<br><br>Students also are supported through a student organization and Facebook group, and induction activities for graduates in their first two years in the profession are planned. |
| Induction Support | *Information on induction support of pre-existing program graduates is unavailable.* | Through an ongoing connection with the program's alumni group on Facebook, ProgramTeach has asked alumni to help design an effective induction program. The program is also coordinating with area and state administrators to align the program with the state required mentoring program. |
| Program Improvement | *Information on program improvement activities in the pre-existing programs is unavailable.* | ProgramTeach tracks enrollment and retention in the program and profession. Operational and instructional program data are reviewed regularly, both in a subgroup of the program's steering committee and in an annual program retreat, in order to make programmatic decisions and improvements. |
| Numbers of Graduates | In 2006, prior to ProgramTeach implementation, the pre-existing programs combined produced 12 science and 11 mathematics teachers. | 49 total through Spring 2011 (34 in the sciences, 15 in math)<br><br>About 50 to 60 per year projected by 2014 |
| Program Retention | *Information on program retention in the pre-existing programs is unavailable.* | Step 1 to Step 2 (as of Spring 2012): 60.2%<br><br>Step 1 to Apprentice Teaching (Fall 2008 to Spring 2010): 24.9% |

*ProgramTeach's Adaptations to the UTeach Model*

| Adaptation to the UTeach Model | Rationale for Adaptation |
|---|---|
| ProgramTeach is led by three co-directors, rather than the UTeach model of two. | ProgramTeach co-directors represent the university's unique structure, including both the colleges of science |

| Adaptation to the UTeach Model | Rationale for Adaptation |
|---|---|
| | and education, as represented in the UTeach model, and a STEM education center unique to the university. |
| Classroom, office, storage, and student workroom space for the program currently is split among several buildings. Although a small workroom is available to students, the current space is inadequate to support student collaboration, and materials are not conveniently available.<br><br>*Ideally, all program space would be contiguous and conveniently located near students' STEM content course classrooms.* | ProgramTeach's physical space is desirable given current budgetary constraints at the university. As the university's financial situation improves, ProgramTeach will seek physical space – in particular, a student workroom – that can better meet the unique needs of the program. |
| ProgramTeach does not offer tuition reimbursement for its Step 2 equivalent course.<br><br>*Ideally, tuition reimbursement would be offered for both Step 1 and Step 2, in order to reduce students' financial commitment as they continue to "try out teaching" in the second UTeach course.* | ProgramTeach students do not mention tuition reimbursement as a motivator for enrolling in Step 2. |
| Master teachers are appointed full-time by the university in the university's science education center as "master teachers," rather than as non-tenured clinical faculty. | Master teacher classifications represent the university's unique faculty and staff appointment structure. |
| As of Spring 2011, four of the six master teachers were paid from the university's recurring instructional budget.<br><br>*Ideally, all master teachers would be paid from university funds in order to further institutionalize the program and ensure its sustainability.* | Permanent funding lines have been restricted across the university. ProgramTeach will move all master teachers to institutional funding when that restriction is lifted. |
| Mathematics and science majors do not take the Perspectives on Science and Mathematics course together.<br><br>*Ideally, all STEM majors would be co-enrolled in order to stimulate cross disciplinary discussion and collaboration.* | Because an equivalent course for mathematics majors existed prior to ProgramTeach implementation, mathematics majors have continued to take the pre-existing course, while science majors now take the UTeach-based course. |

*ProgramTeach Sustainability: Remaining Challenges and Recommendations*

*"It's going to be sustained, and we'll be here for a very long time… We definitely are well known. I think the people that we work with, the divisions that we work with across the university, get the idea that we're well supported… It's a wonderful example of a project that began with a grant that, in reality, is going to be sustainable. Even with federal grants, many times, a lot of these projects are never sustainable. And a lot of that goes to the leadership that was involved in bringing this from a start-up organization that had no budget really to being a separate entity and working with our upper administration leadership to make sure that all the parts and pieces continually fall into place. Not everything is there yet, but we are awfully, awfully close."*

– Advisor, Spring 2011 focus group

As is true of all of the universities with which the UTeach Institute works, ongoing institutional commitment is essential to the sustainability of ProgramTeach. Ideally, for example, all master teachers should be paid through the university's recurring instructional budget, and contiguous space, adequate to support the size of the program and convenient to students' STEM major classrooms, should be provided for ProgramTeach offices, classrooms and labs, storage space, and a student workroom. Continued ongoing communication with university leadership, through regular meetings and provision of documents like ProgramTeach's five-year strategic plan, is essential to sustaining university commitment.

Related to this idea is the university's commitment to raising endowment funds for the program. As of Spring 2011, ProgramTeach had approximately $104,000 in its endowment, with a long-term goal of $12 million. In order to appropriately fund components of the program not typically covered by university funds (e.g., mentor teacher stipends), ProgramTeach must be a fundraising priority for the university.

An especially salient challenge for the program at this point in its development is implementation of an induction program that will provide intensive support to ProgramTeach graduates in their first years of teaching. Because program graduates who remain in the state also will participate in the state affiliated mentorship program, ProgramTeach is in the unique position to leverage existing state resources to enhance induction support for its graduates. Continued participation in the national UTeach community is recommended, particularly as the program develops an induction model to fit its state and local contexts.

Finally, ProgramTeach does not offer tuition reimbursement for its Step 2 equivalent course. As universities begin to implement adaptations such as this, the UTeach Institute expects to use what is learned (e.g., *Is tuition reimbursement for both Step 1 and Step 2 necessary to achieve UTeach model results?*) to inform and streamline the UTeach model and the ways in which it is implemented nationwide.

In order to share adaptations and facilitate improvements to the UTeach model, we aim to maintain partnerships with, and facilitate relationships among, UTeach-based programs. As a pilot site for UTeach replication, ProgramTeach has been an especially valuable

partner to the UTeach Institute thus far, providing consultants for site visits to other universities, sharing resources at the national conference and elsewhere, and often providing feedback on our own processes and protocols. We anticipate that ProgramTeach will continue to contribute to the national UTeach community as it evolves and gains momentum in an effort to inform best practices in STEM teacher preparation.

## Significance

Several factors make this work unique. First, we are unaware of any effort to systematically replicate an entire academic program – including multiple courses and operational procedures to support a small department – in a higher education setting. Although we have not yet analyzed data for all universities over a full four-year implementation period, we have developed some formative impressions of the similarities between UTeach and the programs at the universities with which we work.

Broadly, we are struck that universities with such different characteristics and student populations are implementing courses with similar content in roughly the same sequence, involving instructors with similar areas and levels of expertise, attending the same support events, and asking similar questions. These universities have implemented programs that bridge colleges of science and education, actively recruit STEM majors, promote early and intensive field experiences, incorporate relevant and authentic STEM content in their professional development courses, establish endowments to ensure sustainability, and support students with a variety of benefits. We are satisfied by our formative observations that institutional change – as suggested by ProgramTeach's data – is occurring in the universities with which we work.

The university setting, however, also presents unique challenges for program replication. Perhaps the most significant lies in engaging faculty members – experts in STEM and STEM education themselves and peers of the developers of UTeach – in modifying or teaching new courses and becoming advocates for the new program, particularly when the new program is very different from the one(s) in place prior to replication, if there were program(s) in place.

The K-12 educational community has long experienced pressures to adopt and adapt innovations in curriculum and instruction, based on evidence and research, but the higher education community rarely has been asked to replicate another institution's program with fidelity. We have found that we must be much more explicit in communicating our expectations that the national community adapt and improve – not simply replicate – the program model than perhaps we would need to be in a different setting (e.g., K-12). Indeed, we recognize the concentration of the expertise and commitment of our partners as a major advantage of replication in this setting. We feel certain that the UTeach model already is being improved and strengthened under the continuous scrutiny of a national community of experts dedicated to STEM education.

Second, because we work with such a large community of STEM education experts – currently situated across 29 universities, and growing – the potential for true social change is great. Engaging these experts in conversations and research surrounding STEM education may be the key to both the long-term sustainability of the national UTeach community and continuous improvement of the model.

## References


Beth, A. D., Hughes, K. K., Romero, P., Walker, M. H., & Dodson, M. M. (2011, February). *Replication as a strategy for expanding educational programs that work: The UTeach Institute's approach to program replication.* Paper presented at the annual meeting of the American Association of Colleges for Teacher Education, San Diego, CA. Available at http://uteach-institute.org/publications.

Century, J., Rudnick, M., & Freeman, C. (2010). A framework for measuring fidelity of implementation: A foundation for shared language and accumulation of knowledge. *American Journal of Evaluation, 31,* 199-218.

Cotner, B., Herrmann, S., Borman, K. M., Boydston, T., & LeFloch, K. C. (2005). *A deeper look at implementation: School-level stakeholders' perceptions of comprehensive school reform.* Washington, DC: American Institutes for Research.

Hall, G. E., & Hord, S. M. (2010). *Implementing change: Patterns, principles, and potholes.* Upper Saddle River, NJ: Prentice Hall.

Hill, L. G., Maucione, K., & Hood, B. K. (2007). A focused approach to assessing program fidelity. *Prevention Science, 8,* 25-34.

Potter, C. (2006). Program evaluation. In M. T. Blanche, K. Durrheim, & D. Painter (Eds.), *Research in practice: Applied methods for the social sciences* (2nd ed.) (pp. 410-428). Cape Town, South Africa: University of Cape Town Press.

Yarbrough, D. B., Shulha, L. M., Hopson, R. K., & Caruthers, F. A. (2011). *The program evaluation standards: A guide for evaluators and evaluation users* (3rd ed.). Thousand Oaks, CA: Sage.