

TR@TC³--TEACHING RESIDENTS AT TEACHERS COLLEGE³

Teachers College, Columbia University (TC) is pleased to submit this proposal to the U.S. Department of Education Office of Elementary and Secondary Education: Teacher Quality Partnership Grant Program in response to *Absolute Priority: Partnership Grants for the Establishment of Effective Teaching Residency Programs; Competitive Preference Priority 1: Projects Designed to Improve Student Achievement or Other Educational Outcomes in Computer Science; and Invitational Priority: Spurring Investment in Opportunity Zones*. We are requesting funding in the amount of \$6,224,017 to support a teaching residency program over the five-year period beginning October 2019.

Absolute Priority: Partnership Grants for the Establishment of Effective Teaching Residency Programs

We propose an 18-month graduate-level teaching residency program that will lead to New York State certification and a Master's degree. **Teaching Residents at Teachers College³ (TR@TC³)** will recruit academically talented, diverse individuals and transform them into exemplary, highly qualified teachers in Science-Students with Disabilities (SCI-TSWD, dual certification), Mathematics-Students with Disabilities (MATH-TSWD, dual certification), Science-English to Speakers of Other Languages (SCI-ESOL, dual certification), Mathematics-English to Speakers of Other Languages (MATH-ESOL, dual certification), Students with Disabilities-English to Speakers of Other Languages (TSWD-ESOL, dual certification) who can capably meet the needs of children and youth attending high-need urban schools within our partnering LEA district network that includes Districts 5, 6, 9 and 79 and the Eagle Academy Foundation Schools. The goals for **TR@TC³** are to:

- Recruit, prepare, and graduate academically talented, diverse candidates from under-represented groups (including racial/ethnic minorities, women in Science/Mathematics, and non-traditional students such as career changers), with a particular focus on those who are from local New York City communities, as highly qualified MATH-TSWD, SCI-TSWD, MATH-ESOL, SCI-ESOL, and ESOL-TSWD teachers for high-need schools in New York City (NYC);
- Design and implement an 18-month teaching residency program with/for schools in our partnering LEA district network culminating in New York State (NYS) dual teacher certification and a Master of Arts degree;
- Collaborate with partners including schools and educators within our LEA district network, teacher education and Arts and Sciences faculties, John Jay College of Criminal Justice (explained further in the proposal) faculty, and other **TR@TC**³ community members to implement and continually improve the teaching residency program;
- Design and implement innovative curricula that deepen and enrich Teaching Residents' knowledge base in the STEM+C areas, develop their understanding of instructional design using Universal Design for Learning and Inclusive Curriculum principles, and prepare them to effectively address the intersecting, complex, multiple needs presented by students in high-need schools;
- Design and implement a comprehensive, relevant and responsive two-year induction program to support the success and retention of graduates in high-need NYC schools;
- Support the professional development of teachers and leaders in partnership schools using strategies that create opportunities for experienced teachers to lead from the

classroom and provide novice teachers with enhanced support, particularly in STEM+C content areas;

- Engage faculty in continuous review of the residency program and the consideration of lessons that can be applied to other teacher education programs at TC and elsewhere;
- Conduct ongoing research on the impact of teaching residency programs on teacher retention and student learning, particularly in urban, high-need contexts.

Competitive Preference Priority (CPP) 1: Projects Designed to Improve Student Achievement or other Educational Outcomes in Computer Science

Teaching Residents at Teachers College³ (TR@TC³) will rest on four instructional pillars to ensure that every Teaching Resident (TR) acquires a foundational set of knowledge and skills that responds to the needs identified by our partnering LEA district network and is therefore essential to their success as teachers for/in partnering schools. These four pillars are: STEM+C Literacy and Enrichment; Instructional, Digital and Assistive Technologies; Universal Design for Learning and Inclusive Curriculum; and Co-Teaching and Co-Planning across STEM+C subjects, Special Education and English as a Second Language (Figure 1). Two of the four pillars directly address CPP1 and will guarantee the integration of high quality preparation and professional development in STEM+C subjects, with special attention to computer science such that TRs as well as other **TR@TC³** community members will have multiple opportunities to enhance their STEM content knowledge and pedagogy.

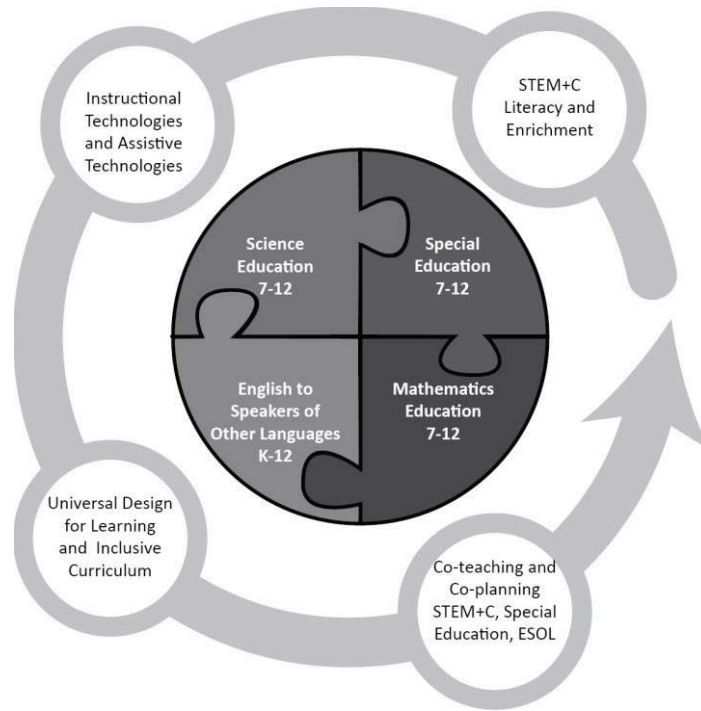


Figure 1: TR@TC³ Four Pillars

This will be accomplished through:

- A partnership with the Science and Mathematics Education Programs as well as other resources at Teachers College, Columbia University. These programs bring extensive experience in the recruitment and preparation of high quality Science and Mathematics educators for the same high need NYC classrooms for which TRs are preparing. Program faculty are equally expert in science or mathematics and in education and offer courses in both STEM+C content and pedagogy, enacting their stance that good science and mathematics teaching begin with strong subject matter understanding. In addition, program faculty are engaged in innovative projects around STEM+C instruction that directly align with TR@TC³ goals. One example is the Harlem Schools Partnership for STEM+C Education, “a collaborative effort of Teachers College, and the Fu Foundation School of Engineering and Applied Science at Columbia University...[that]...increases teacher

knowledge of STEM+C content and teaching practices, diversifies assessment of student learning, and ensures that English Language Learners are successful in STEM”

(<http://www.tc.columbia.edu/mst>).

- Institutional collaborations that will give TRs and our school partners access to additional high quality and rigorous STEM courses, experiences and enrichment. Collaborators include Columbia University’s Fu Foundation School of Engineering and Applied Science, a leader in STEM fields since 1867, as well as the Bronx River Alliance. Columbia University’s STEM resources are numerous and include the Consortium for Policy Research in Education that has produced empirical and conceptual work on learning progressions in science and in mathematics; the Columbia Center for New Media Teaching and Learning’s extensive library of digital portfolios and numerous digital tools that support classroom instruction and teacher learning such as VITAL (Video Interactions for Teaching and Learning) and Mediathread, an innovative platform for working with multimedia (<http://ccnmtl.columbia.edu>); and cutting edge research on mathematical thinking by TC faculty.
- Multiple field experiences and practica that will introduce TRs to many different models of STEM+C in action in NYC schools help them to connect university learning with practice, and engage in critical analysis of and inquiry into science curriculum and instruction. These experiences will begin in students’ first term and continue throughout the 18 months of the program. The vast network of schools to which TC is connected means that **TR@TC³** residents’ exposure to schools in the LEA will extend far beyond the partnership schools.
- A partnership with the School of Engineering at Columbia University to particularly emphasize and strengthen the engineering and computer science components of STEM+C Of direct relevance to **TR@TC³** are the science and mathematics courses that Engineering

faculty collaborators offer that integrate engineering design principles and use NYC as the context for developing deep and culturally relevant content knowledge.

- Intensive hands-on learning in STEM+C through partnership with a community-based organization engaged in conserving and studying local natural resources The Bronx River Alliance provides opportunities for students and teachers to participate in river clean-up and restoration and uses the river as a classroom for students and base for educator workshops.

A second aspect of CPP1 is the recruitment of individuals traditionally under-represented in STEM+C. TC’s residency program has proven highly successful at recruiting people of color to teaching. With an average of 48% of students per cohort (range of 25% to 60%), our numbers have been consistently and significantly higher than current demographics for the profession where less than 20% of teachers are racial/ethnic minorities (Ahmad & Boser, 2014; Boser, 2011). **TR@TC**³ will continue to employ the productive recruitment strategies that have led to this strong recruitment trend, as well as explore and develop new pathways to teaching programs, beginning with John Jay College of Criminal Justice (JJAY) for example, that are designed to target local students from NYC communities who attended NYC public schools themselves.

Invitational Priority: Spurring Investment in Opportunity Zones

Three districts (District 5, 6, and 9) in our LEA are geographically organized and represent areas where students who live in Designated Opportunity Zones are served. Table 1 shows the Opportunity Zones that are located within each of these district areas.

Table 1: Partnering LEA District Network Opportunity Zone Census Tracts

	District 5	District 6	District 9
Number of Students	10,549	20,651	32,738
Opportunity Zone	36061020901	36061024100	36005020501
Census Tracts within the District	36061021303	36061024200	36005020502
	36061021500	36061024301	36005021502
	36061021600	36061026100	36005023100
	36061021800	36061026900	36005024300

	36061021900	36061027700	36005024501
	36061022200	36061027900	36005024502
	36061022301	36061028700	36005024700
	36061022302	36061029100	36005025100
	36061022400	36061029300	36005025500
	36061023000	36061029900	36005025700
	36061023200	36061028700	36005036100
			36005036502
			36005037504
			36005038302
			36005038500
			36005038900
			36005039100
			36005039300
			36005039500

<https://www.cdfifund.gov>

Section 1: Project Design

TR@TC³--Experience to the Third Power

TR@TC³ benefits from a wealth of experience acquired over the course of two previous implementation cycles. In the first, Teaching Residents at Teachers College, Columbia University (TR@TC), supported by a 2009 Teacher Quality Partnership Grant, we established a program that led to key successes such as:

- Robust recruitment of diverse persons to teaching—on average 42% of TRs across four cohorts are people of color; 52% have been non-traditional students, such as career changers.
- High level of satisfaction with the program expressed by TRs—more than 80% of graduates across cohorts 2 to 4 felt prepared to teach in urban schools.
- High level of satisfaction with TR@TC graduates reported by 2012-13 and 2013-14 hiring principals; about 80% rated TR@TC graduates as better than graduates of other programs.
- Excellent retention rates, far above those typically reported for challenging, urban schools: 63% of TR@TC graduates remain teaching in NYC in the same kinds of high need schools

where they completed their residencies; 83% remain teaching in high need schools in other central cities such as Baltimore.

- Comprehensive and targeted professional development of NYC teachers—mentor teachers overwhelmingly reported growth as reflective practitioners due to their work with TRs.
- Successful implementation of innovative instructional practices such as education rounds, co-teaching and co-planning, integrating digital literacies and new media, etc.
- Individually responsive, tailored induction support provided to TRs according to the needs of their specific schools and students.
- Inclusive induction practices such that new teachers, who co-teach with our program graduates in hiring schools, have also benefited from our induction program/support.
- Education Rounds as a continuing professional practice among TR@TC alumni.

Building on these successes and lessons learned, Teaching Residents at Teachers College, Columbia University (TR@TC2), supported by a 2014 Teacher Quality Partnership Grant, paved the way for an enhanced program and strengthened offerings that repeated the successes evident for the first cycle, and included additional achievements related to program modification such as:

- Recruitment of teachers (65%) highly familiar with and committed to NYC schools and students given their own histories as NYC residents and students.
- Highly competent Science educators who are additionally prepared to teach Science to youth with special needs or who are English language learners.
- Continued high retention rates of 98% as teachers of record in NYC, high need schools.
- Greater success recruiting diverse persons to teaching—on average 60% of TRs across four cohorts are people of color, 33% have been non-traditional students, such as career changers, one TR has been a person with a disability.

- Highly competent special education and ESOL teachers who are additionally ready to support diverse learners in high stakes subjects such as Science and Mathematics.
- TR graduates adept in co-teaching and co-planning, essential skills for 21st century teachers, according to research on the quality teachers.
- Integration of mentor teachers (school partners) as co-instructors and curriculum designers.
- Enhanced Induction Program that supported TR graduates who are now experienced teachers and ready for teacher leadership development.

Through these past experiences, we have used our growing knowledge to continuously enhance and further develop experiences for pre-service and in-service teachers, providing increasingly rich and nuanced preparation and professional development for them. Now, as we apply for this 2019 Teacher Quality Partnership Grant, we are proposing an augmented and re-imagined residency program that incorporates our best and current thinking and addresses the specific and pressing needs of our LEA district network. Indeed, as our new program title indicates we anticipate applying our expertise *to the third power* as we continue to strive to prepare teachers who will engage in long-term careers as excellent educators in high-need public schools serving diverse urban youth.

Recruitment and Selection

The aim of our recruitment efforts remains unchanged and ever more focused--to attract the best candidates to **TR@TC³** and to the teaching profession. To do this, we will look for candidates who possess qualities that research has established as predictors to student achievement such as strong content preparation, high GPA, attendance at quality undergraduate institutions, and commitment to teaching as a professional career. Additionally, in keeping with an established

research base that substantiates the importance and benefits of students having access to teachers who are from their communities, more representative of the student populations in urban, high-need schools, and can serve as exemplary teachers and positive role models for minority youth, our recruitment efforts will prioritize strategies designed to attract candidates from local communities who attended NYC public schools and wish to re-enter these spaces as teachers. Historically, we have proven our ability to attract diverse applicants as a result of efforts stemming from a multi-pronged strategy that has extended beyond marketing to include active outreach, personalized and responsive communication, and consistent follow-up of all inquiries. We will continue this comprehensive approach to recruitment, which has yielded positive results.

Additionally, through a new partnership with John Jay College of Criminal Justice (JJAY), a CUNY (City University of New York) institution, we intend to begin to develop new pathways to teaching designed specifically for local students who wish to enter a teaching career. Currently, JJAY does not have an education department and offers no education classes. However, as a result of students indicating interest in exploring this profession, JJAY faculty will collaborate with **TR@TC³** in developing a *Pathways to Teaching* program that introduces students to the profession of teaching and supports them in developing a vision for this aim that aligns with JJAY's goal of preparing students for careers for life-long service to their local communities. **TR@TC³** will work with JJAY faculty to devise strategies for counseling these students in ways that introduce them to potential pathways to teaching and offer opportunities to explore whether this career choice is a good fit. These efforts will begin with the implementation of a program designed to provide undergraduate students with the opportunity to explore the profession of teaching by acting as interns who will apprentice with experienced teachers and TRs as they work with NYC high school students in one of our July *TR@TC Global Citizen*

programs (as described later). We anticipate that this pilot program will grow into a robust recruitment opportunity that not only benefits **TR@TC³**, but also will benefit the teaching profession more broadly as students are motivated and inspired through experiencing the possibilities associated with a career in teaching.

Applying for **TR@TC³** includes a rigorous two-step application process to identify and select candidates who demonstrate strong content knowledge and commitment to working in urban, high-need schools. The first stage requires the completion of a standard TC application plus two **TR@TC³** targeted essays, which provide both program faculty and **TR@TC³** staff members the information necessary to assess whether applicants meet core content knowledge requirements from their undergraduate and other formal schooling experiences and have performed to high academic standards, plus demonstrate some awareness of and affinity for teaching in urban schools.

The second stage involves an extensive interview process where applicants participate with other candidates in an Admissions Institute consisting of a series of experiences that mirror those central to the work TRs complete in the residency program. Applicants collaborate in small groups, observe students in a partnership school classroom, participate in a planning activity with Mentor Teachers, engage in an academic discussion, and participate in individual interviews with **TR@TC³** and college program staff. This experience engages applicants with **TR@TC³** community members in a variety of ways and provides opportunities for all (including the candidate) to consider multiple dimensions in weighing whether the candidate is a good fit for the program. This second part of the application process grew out of our experience in the first two iterations of the program where we learned the importance of considering skills only observable in person, such as how applicants listened to one another, interacted with students and

teachers, and applied new ideas introduced in the course of the Institute. This additional step in the selection process allows qualities and dispositions essential to good teaching to emerge and provides insight into whether or how “walk” aligns with “talk.” Likewise, this process provides applicants with a concrete experience to use as they consider whether **TR@TC**³ aligns with their vision of what they hope to experience as they prepare to become a teacher.

Applicants who successfully meet these rigorous selection criteria will be:

- Enrolled in a degree-granting teacher dual-certification program at TC, concurrent with the residency experience;
- Placed as a Teaching Resident in one to two partnership schools over a full school year;
- Engaged in graduate coursework, professional study, and educational activities closely connected to and informed by classroom practice, district curriculum and learning standards, and diverse students’ needs, thus comprising a synergistic blend of practice and theory;
- Eligible to receive a living stipend upon acceptance to the program;
- Supported by a partnership that links urban schools and practitioners from our partnering LEA district network, university departments and faculty, and a community-based partner;
- Mentored, guided and supported by Mentor Teachers and Residency Supervisors during the residency, and an Induction Mentor during the first two years of practice, all of whom have been carefully selected and rigorously trained in contextual and responsive practices;
- Required to commit to at least four years of service as a teacher in a high-need school—preferably in NYC—upon completion of the program and the attainment of certification;
- Supported and guided during the first two years of their teaching career through an induction program designed by **TR@TC**³ to meet the needs, enhance the skills, ensure the success, and increase the retention of new teachers in high-need schools.

- STEM+C – Professional development and instructional support centered in the STEM+C content areas, differentiation of content for diverse learners undergirded by principles of constructivist, experiential and project-based learning.

Table 2 shows the anticipated recruitment schedule for four cohorts of Teaching Residents. In reviewing the table, it is important to keep in mind that each cohort will actually receive **TR@TC³** support for three+ years. We also feel that it is best to begin with a smaller cohort, given the tight turnaround time available for planning and recruitment between 2019 funding decisions and the first cohort in January 2020. A smaller cohort will also allow us to pilot program enhancements and modifications outlined and enable us to extend the planning period, which, informed by practice, ensures smooth operation during years 2-5 for **TR@TC³**.

Table 2: Recruitment Schedule for TR@TC³

	2019-1/2020	1/2020-6/2021	1/2021-6/2022	1/2022-6/2023	1/2023-6/2023
	Planning & Recruitment				
Cohort 1		15			
Cohort 2			20		
Cohort 3				20	
Cohort 4					20

The Eligible Partnership

The eligible partnership for **TR@TC³** comprises a network of NYC districts including Districts 5, 6, 9, 79 and the Eagle Academy Foundation schools; a consortium of high-need schools served by the LEA district network; and partner institutions of higher education (IHE; four programs of education within the IHE, a department of Arts and Sciences within the partner institution, a second IHE partner, and a collaborating community-based organization).

Our partnering LEA includes a consortium of four partnering districts and one school network: **Districts 5, 6, 9, 79, and the Eagle Academy Foundation**. A network that is located within the NYC five borough area, the needs of this LEA mirror those of the larger NYC public school system but also bring a distinct set of needs and opportunities.

Districts 5 and 6 represent two districts that are in the immediate neighborhood of Teachers College with one district spanning Morningside Heights and Harlem neighborhoods and the other Washington Heights and Inwood neighborhoods. Partnering with these districts represents an opportunity for Teachers College to support the needs of the community that immediately surrounds us.

District 9 serves students who live in the neighborhoods of Highbridge, Morris Heights, Mount Hope, and Mount Eden in the Bronx. This district is a participating district in the NYC Bronx Plan initiative, which is focused on recruiting and retaining teachers who are working specifically in Bronx schools – particularly in special education, ESOL and, STEM.

District 79 is a city-wide district providing alternative schools and programming for students. This includes a wide range of supports designed to provide education to students in settings such as alternative high schools, night schools, co-op tech schools, and correctional education schools. District 79 serves some of the most vulnerable students within NYC who also primarily represent students from racial/ethnic minority and ESOL populations.

The Eagle Academy Foundation is a network of schools within NYC that focuses specifically on supporting a network of “all male, grades 6 through 12, college-preparatory schools in challenged, urban communities that educate and mentor young men into future leaders committed to excellence in character, scholastic achievement” (<https://eafny.org>).

The majority of schools within each member of our LEA district network qualify as high-need schools, with the majority of them also serving predominantly racial/ethnic minorities and a large population of English Language Learners (see Table 3).

Table 3: Partnering LEA District Network Racial/Ethnic Minorities & Poverty Rates

	District 5	District 6	District 9	District 79	Eagle
Number of Students	10,549	20,651	32,738	14,835	2,260
Racial/Ethnic Minorities	95%	94%	98%	94%	92.46%
Poverty Rates	84%	87%	93%	90%	58.6%
Free/Reduced-Price Lunch*	83%	87%	93%	**	
Students w Disabilities	26%	21%	24%	32%	28.74%
English Language Learners	10%	30%	25%	26%	6.8%

* Statistic from 2016-2017 – because of the transition to the Free School Lunch for All program, NYC no longer collects these statistics, so this is the most recent number available.

**Data not collected for D79 schools

As is the case with NYC schools in general, high-need areas of teacher certification within the partnering LEA include, according to the US Department of Education website (<https://tsa.ed.gov/#/reports>), Mathematics (7-12), ESOL (K-12), Science (7-12), and Special Education (7-12), which are all shortage areas within NYC public schools. Additionally, teachers in STEM areas, ESOL and special education/TSWD represent shortages that are particular focuses for recruitment in schools throughout the city (<http://teachnyc.net>). These specific needs are not surprising given that 40% of NYC public school students speak a language other than English at home and that 1 in 5 students have special needs (<http://teachnyc.net>). These needs also represent those within our partnering LEA district network.

The consortium of NYC schools with whom we will partner, and that are within our partnering LEA district network, serve grades 6-12 with the most recently available statistics for each showing that 45% or more of their students qualify for free and/or reduced-price lunch rates. In the 2017-2018 school year, the Free Lunch for All program began offering free breakfast and lunch for all students throughout all of NYC (schools.nyc.gov). As a result of this program, schools within our partnering LEA district network (or any of NYC) no longer collect data

regarding eligibility for free and/or reduced-price lunch. However, in addition to 2016-2017 free and reduced-price lunch data, current data measuring numbers of families eligible for Human Resource Administration (HRA) assistance is also included.

Teachers College, Columbia University (TC) will serve as the **partner IHE** and also the manager of the grant. TC is the oldest and largest graduate school of education in the United States and has been preparing teachers and educational leaders since 1887. The more than 5,000 students who attend TC engage in study for a broad range of careers that align with fields that either focus on policy-making and school reform or preparing educators who serve in educational, behavioral, psychological, technological, health, and other contexts. In both areas, the overall aim of the TC is to work toward more equitable and accessible opportunities to learning at and for all ages.

More than 300 TC student teachers are placed in NYC schools every semester, which translates into ongoing relationships with hundreds of NYC public schools. TC is also a leader in research on urban education through the Institute for Urban and Minority Education, the National Center for Restructuring Education, Schools & Teaching, and the Campaign for Educational Equity. The university is also home to the Teachers College Inclusive Classrooms Project and the Teachers College Reading and Writing Project. Together, both projects work in hundreds of NYC schools, providing professional development and curriculum support.

In fulfilling our aims, **TR@TC³** will have the full support of the **Office of Teacher Education (OTE)**. OTE operates at the nexus of the university and public schools, providing support to eight teacher education departments and acting as the primary liaison between TC, public schools throughout NYC, and the New York State Department of Education. OTE is a central point of access for both faculty and students in preparation for student teaching

experiences, finalizing certification requirements, and the organization of support staff such as Student Teaching Supervisors. Because of its position at TC, OTE is uniquely positioned to assist **TR@TC³** as well as students and faculty affiliated with the program. Additionally, OTE is able to engage with a diverse range of faculty at TC to work with principals, mentors, and TRs in partnership schools.

The **MATH, SCI, TSWD, and TESOL programs of education within the partner IHE** will be directly involved in **TR@TC³**. With the shift to a dual-certification program, program partners will embark on an effort towards increased collaboration and cooperation. **TR@TC³**'s partnering programs include established relationships as well as some new collaborations. The programs of Teaching English to Speakers of Other Languages (TESOL/ESOL) and Science Education (SCI) represent established relationships; both have expressed enthusiasm for continuing as partners given their past experience with the residency program and the caliber of candidates they were able to recruit and support. The Intellectual Disabilities/Autism (ID/A/TSWD) represents a renewed relationship that was paused for the duration of **TR@TC²** and has now been reestablished. Finally, Mathematics Education (MATH) represents a new partnership for the program. As stated earlier, these partnerships represent new opportunities for collaboration as faculty from each program have committed to work toward the common goal of mapping out and enacting this dual-certification residency program. Additionally, dual-certification represents a rare but much-sought-after group of teachers within our partnering LEA district network that have dedicated content knowledge in STEM+C areas and are also able to meet the specific needs of students who have historically represented the most vulnerable populations in the districts.

The **arts and sciences partner** working with TR@TC³ is **Columbia University's College of Engineering: The Fu Foundation School of Engineering and Applied Science.**

With a rich history of innovation and scientific breakthrough, Columbia University's College of Engineering was established in 1867 and has been a perpetual leader in fields such as computer science, communications, climate disruption, bio-engineering, and nano-technology. Aligning with our aim to prepare teachers to support children and youth as critical and curious learners through deep inquiry, the mission of The Fu Foundation School of Engineering and Applied Science is "to expand knowledge and advance technology through research, while educating students to become leaders and innovators informed by an engineering foundation"

(<https://engineering.columbia.edu/about/mission-vision>).

A **second partnering IHE** that is working with TR@TC³ is **John Jay College of Criminal Justice (JJAY)**. Serving an overwhelming number of local undergraduate students who, themselves, attended New York City public schools, this institution is one of the nation's most prestigious liberal arts institutions. Also known as a premier Hispanic and Minority Serving Institution, (HIS/MSI), JJAY boasts an undergraduate student body of 13,000+ students. Additionally, JJAY's mission prioritizes the pursuit of justice in its many dimensions and emphasizes career pathways that are aimed toward public service.

While focused on preliminary work in establishing new and stronger pathways to teaching for students who may have considered this career, this partnership will provide opportunities to engage in diverse learning spaces that include high school students, public school teachers, undergraduate students, TRs and others as all work to imaginatively engage in teaching practice.

The Bronx River Alliance will support **TR@TC³** as a **community/sciences partner**. The Bronx River Alliance serves as a coordinated voice for the Bronx River in an effort to protect, improve, and restore the Bronx River corridor.

Description of the Teacher Residency

The proposed program will begin each year in January and run for 18-months through June, followed by a two-year induction program. Teaching Residents (TRs) will be engaged in: university coursework required by their specific certification area; a Core Foundations Experience; an Intensive Summer Institute (ISI); two residency experiences over the full school year anchored by an ongoing Core Integrating Seminar (CIS); school visits and observations; and other professional development activities. Post-graduation and into their first two years of teaching, TRs will continue their development and learning with support provided by **TR@TC³** Induction Mentors as well as a range of induction activities and professional development.

As stated earlier, **TR@TC³** will rest on four instructional “pillars” designed to ensure TRs’ acquisition of a foundational knowledge/skill base that responds to the needs identified by our partnering LEA district network. These four pillars will be integrated throughout the program so that by program completion, all TRs, regardless of certification area, will develop basic competencies in: STEM+C Literacy and Enrichment; Instructional, Digital and Assistive Technologies; Universal Design for Learning and Inclusive Curriculum; and Co-Teaching and Co-Planning across STEM+C, Special Education and English as a Second Language. A description of the program chronology follows, highlighting key activities, courses and experiences over the 18 months. Figure 2 lays out a roadmap for **TR@TC³**, from program start through induction.

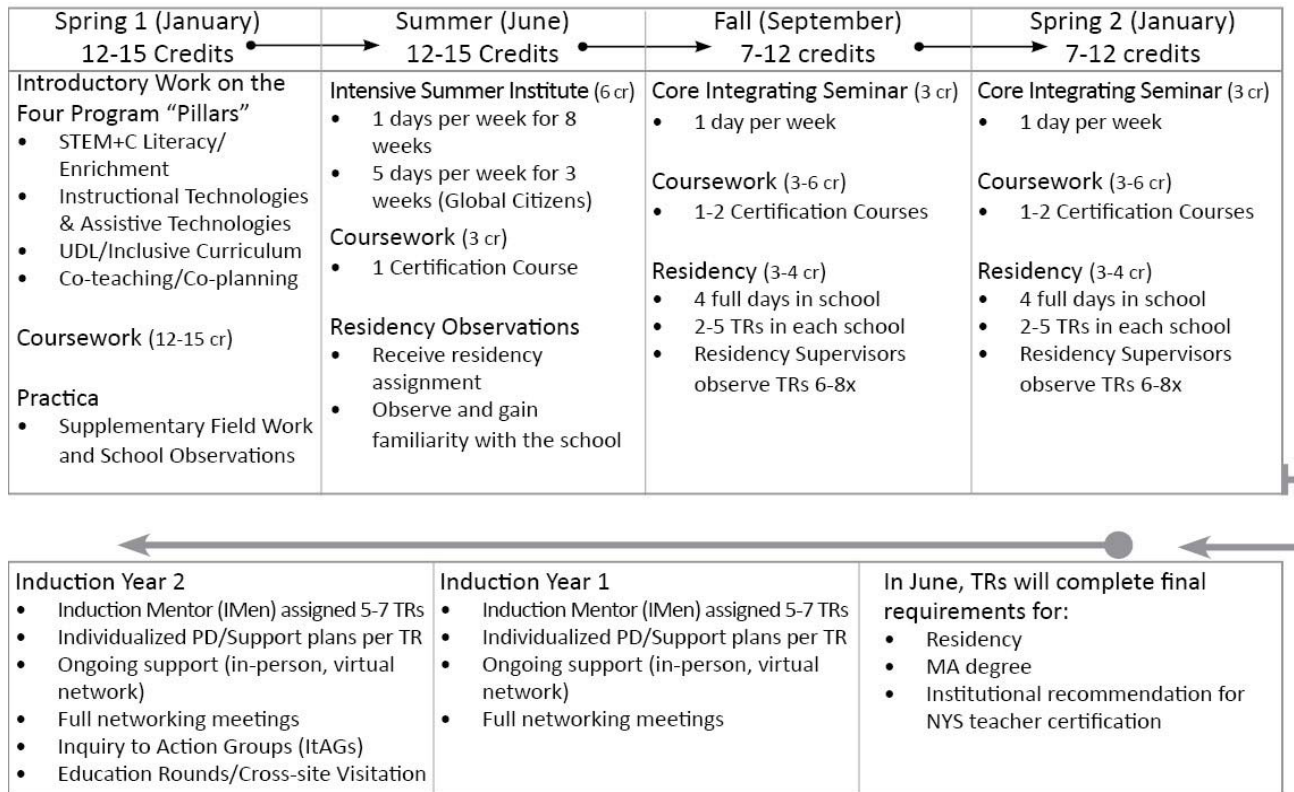


Figure 2: TR@TC³ Program Timeline

Spring 1: January—Building Foundations and Investigating the Field. The initial semester of TR@TC³ is designed to introduce TRs to: 1) the field of education and to NYC schools; 2) foundational principles of teaching and learning; 3) the four pillars so they can immediately begin the process of acquiring essential knowledge. TRs will also begin fulfilling requirements for their certification area and degree program, with the expectation that they will take a full load of 5-6 courses. These courses will be accompanied by practica to support theory-practice connections; practica will be supplemented by classroom observations in partnership schools to begin TRs’ immersion in the partner LEA for the purpose of gaining rich and varied perspectives across the district network.

Introduction to the four pillars will occur through a variety of experiences including learning labs that will be designed to encourage exploration of academic and cognitive skills

through the dual perspectives of student and teacher (for example: building LED cards, observing and guiding students in the classroom to build LED cards, reflecting on similarities and differences between personal experience and observed experience, etc). These experiences will target exploration of each of the four pillars and, more importantly, the connections and conceptual overlaps that tie those pillars together.

Toward the close of the term, TRs will spend full days in schools that represent potential residency assignments where they will familiarize themselves with potential residency placements through observations and meetings with principals and Mentor Teachers (MenTs).

MenTs will be experienced teachers from partnership schools who have been nominated by the principal and have undergone a rigorous selection process that includes an application, an observation of their classroom practice and an interview. The application process has been designed to ensure that prospective MenTs' classroom practice aligns with program goals and with coursework, and to assess their ability to work with diverse learners, gather evidence about student learning using multiple measures, and use these data to inform instruction in order to improve learning outcomes for their students.

All MenTs will receive extensive training and professional development. This support will be informed by Mentoring Standards developed during the first round of the residency program, and will ensure substantive and quality training. MenTs receive three days of orientation and training prior to the start of the school year, and participate in monthly training/support sessions during the year. In addition, MenTs and TRs come together for a full-day retreat each semester to engage in targeted professional development around co-teaching/planning (fall) and assessing students' work (spring). The program also provides on-site support for MenTs as needed. Teachers who are experienced residency program mentors have

been and will continue to be recruited as co-trainers and mentors of MenTs; they will also serve on the MenT selection committee.

Intensive Summer Institute: May to July—Side-by-Side Experience and Exploration.

TRs will participate in the Intensive Summer Institute (ISI) one day/week in May and June and five days a week for three weeks in July. ISI will be led and coordinated by the TR@TC³ co-director, but will involve the participation of other TR@TC³ staff members, TC faculty, MenTs, principals, and other members of the partnership. ISI will focus on providing TRs with introductory experiences in interpreting and understanding curriculum, culminating in hands-on work alongside experienced teachers for three weeks in July to implement one of three *TR@TC Global Citizen* projects (Citizen Scientist, Citizen Activist, or Citizen Computer Scientist) that emphasize exploration and understanding of STEM+C content. The overarching goals of the curricula offered in the *TR@TC Global Citizen* project consist of students 1) engaging in real-life problems through the lens of science, social science, and digital learning; 2) developing inquiry and research skills so as to plan possible solutions to these real-life problems; and 3) carrying out these solutions in efforts to respond to these problems in ways that are effective and sustainable. In engaging in and critically reflecting on these experiences with experienced and new teachers, TRs will continue to grapple with ideas related to 1) knowledge of students from high-need communities who demonstrate “multiple vulnerabilities” (Rong & Preissle, 2009) such as poverty, learning needs, limited English proficiency, health issues, and so on; 2) cognitive development and learning theory; 3) basic literacy assessments and strategies; 4) multi-level instruction and interactive pedagogies; 5) classroom management; 6) district and state standards (such as Common Core standards) and regulations. TRs will enroll in 3-4 additional summer courses, primarily in the May/June Summer A Semester.

At the close of ISI, TRs and MenTs will participate in a multi-day orientation that is designed to support each TR/MenT team in building strong and productive relationships. During this time, TR/MenT pairs will work together building trust and rapport by focusing on their team dynamic and also by engaging in focused planning for the coming year. Together, TR/MenT teams will outline plans for building classroom community, review year-long curriculum maps, discuss initial challenges and opportunities, and explore common priorities and professional interests.

Fall—The Theory-Practice Nexus. This semester marks the beginning of the formal teaching residency. TRs will begin their school assignments working three full days/week in one placement and one full day/week in a second placement. This structure will provide TRs with an opportunity to experience components of both breadth and depth in their residency experience as they are able to participate in and observe two classroom communities—at varying levels of detail—from the beginning of the school year to the end. While there are benefits and drawbacks from any residency configuration, our experience indicates that this arrangement allows residents the experiences they need to meet certification requirements and also have consistent and meaningful experiences as members of the classroom communities where they will work. By participating as a member of two classroom communities for a full year, residents are able to develop relationships with teachers and students with the expectations of a long-term presence in the classroom. Additionally, this arrangement will also enable residents to meet NYS certification requirements for observation and experience in more than one grade level.

In their main placement (three days/week) TRs will begin the residency at the same time as their MenT—before the students have returned to school. While this period before schools officially open is brief, typically two or three days, it affords crucial planning and set-up time,

giving TRs the opportunity to observe and assist their MenT with preparations for the school year. Each TR will be in a partnership school with at least one other TR from the same cohort. The purpose is to create a natural buddy system that will foster sharing and collaboration among peers. Every effort will be made to assign TRs to schools in groups of two to five. Each TR will also work with a Residency Supervisor during the residency year. Residency Supervisors will serve as a crucial intellectual bridge between the residency placements and the university, and will work closely with MenTs and TC faculty. In their role, they will need to balance guidance and instructional support to TRs, with critique and evaluation of their practice. Thus, their perspective will be that of a critical friend and expert whose aim is to observe, dialogue and reflect with the TRs, offering specific feedback and suggesting solutions or alternative strategies to teaching dilemmas in order to encourage continuous improvement on the part of TRs. Residency Supervisors will visit and observe TRs in their school placement 6-8 times each term. As with MenTs, Residency Supervisors will undergo a rigorous application process and be carefully vetted by the OTE. Through our past experiences with Residency Supervisors, we have fine-tuned the training we provide them as well as strengthened and expanded the ongoing communication and professional development they need to be maximally effective in their roles.

The Intensive Summer Institute extends into the academic year but is transformed into an integrating experience, connective tissue that will provide conceptual coherence throughout the residency experience. The Core Integrating Seminar (CIS) is designed to support TRs in developing their classroom practice, and building crucial research-to-practice and theory-to-practice connections. The four pillars will run thematically through CIS—TRs will work on applying and enacting the foundational knowledge base they began to build during the summer. As the nexus for theory and practice, CIS will emphasize student learning and achievement, with

an emphasis on research-based large-effect practices such as grouping and student teaming (Bennett et al., 2005; Kulik & Kulik, 1992; Slavin, 1996), formative assessment (Black & Wiliam, 1998; Young, 2007; Perie, Marion, & Gong, 2007), and planning and instructional design that attends to variations in student learning, fosters deep student engagement and offers students challenging tasks (Corcoran & Silander, 2009). As a multi-faceted experience, CIS will bring together different faculty according to their expertise. Co-planning and co-teaching among these experts will be key since CIS aims to prepare TRs to attend to and connect many variables simultaneously as they consider learners' multi-level and differentiated needs in relation to standards and goals. To guard against fragmentation, the **TR@TC³** co-director will continue as lead instructor for CIS, but will again involve the participation of other **TR@TC³** staff members, TC faculty, MenTs, principals, and other members of the partnership.

CIS will meet once a month for a full day and afford residents space for reflection and critical analysis of their practice. This change results from our past experience which taught us that a weekly seminar session did not allow TRs some necessary breathing room given the constant need to juggle residency and academic demands. In addition, a full day further supports integration as well as in-depth focused work. During the fall, TRs will enroll in up to two additional courses according to the requirements of their degree and certification area.

Spring. Spring mirrors the fall in that TRs will continue in their school-based residencies. Again, TRs may enroll in up to two additional courses according to degree and certification requirements. CIS will continue with the same overarching focus on student learning undergirded by the four instructional pillars. The spring term will also be the time when TRs complete all certification assessments, including the performance assessment edTPA, along with

certification exams required by NYS, and begin the process of securing a full-time teaching position in NYC.

The Induction Program

The program will work with **TR@TC**³ alumni into their second year as teachers of record, using a variety of structures and activities, both electronic and in-person, designed to further their learning and development. Induction will also concentrate on helping TRs to incorporate into their curricula large-effect practices shown by research to positively impact student achievement (Corcoran & Silander, 2009; Hattie, 2009), to move from ad hoc or inconsistent applications of evidence-based practices to deliberate, integrated and consistent implementation.

During both induction years, TRs will each be paired with an Induction Mentor (IMen) who will provide assistance and guidance according to mentees' individual needs. IMens will undergo a rigorous vetting process in which the following criteria will be carefully evaluated: growth mindset approach, asset-based instructional support, collaborative coaching practices, flexibility and adaptability to the novice teacher's needs. In addition, TC's prior experience implementing a residency program means we have a cadre of seasoned IMens on which to draw.

Over the course of our previous residency cycles, we have learned to truly adhere to our own goal of providing assistance and guidance according to the needs of our mentees and allow TRs to take the lead in terms of defining the direction and priorities of the induction supports they need rather than assuming that we can anticipate how to best assist them. This one-by-one and side-by-side approach is indicative of priorities for Induction Mentoring as we recognize that meaningful support must be culturally responsive, attend to the needs of the whole teacher, be context specific, and collaboratively driven. Thus, while the program is framed by clear and common goals and structures (for example, that IMens will help TRs develop their effectiveness

as teachers through coaching, technical assistance and resource identification), there is no expectation that defines similar or structured ways in which these goals are enacted. Indeed, IMens have regularly provided a rich and varied range of supports which have included, but are not limited to, co-teaching and co-planning, arranging inter-school visits (often of more senior TR graduates), demonstration lessons and modeling, guided observations, review of lessons and curriculum, and so on. Sometimes the support has helped a TR strengthen practice, other times support has enabled TRs to extend practice and try something new, bolstered by the IMen “safety net.” This individualized approach notwithstanding, all IMens have and will work closely with our Induction Coordinator who oversees the induction program, maintains face-to-face and online contact with all TRs, meets regularly with IMens for feedback, guidance, and training/professional development purposes, and keeps everyone focused on the same goals.

IMens, with the support of the Induction Coordinator, work with hiring school administrators, establishing strong communication channels in order to make certain that **TR@TC³** does not work at cross purposes to the school and principal, but rather reinforces the goals and mission of each setting in which TRs are employed. It is important that the induction program is welcomed as a trusted collaborator with the common goal of retaining quality teachers and enhancing their teaching effectiveness. One way in which the induction program has been supportive to hiring schools is by opening up group induction activities to other new teachers at the school (including partnership schools), especially those who are co-teaching with program alumni. We have seen these additional community members benefit from those opportunities, benefits echoed by their principals, and so the **TR@TC³** induction program will continue to sponsor full group collaborative working sessions to support professional learning communities, peer exchange and enhancement of teaching practice.

Section II: Evaluation

The Consortium for Policy Research in Education (CPRE) will conduct the evaluation of the **TR@TC³** program, employing a mixed methods research approach. The summative evaluation will consist of an analysis of TRs' (a) educational and employment outcomes; (b) general satisfaction with the program; and (c) instructional practices over time. Whenever possible, the researchers will conduct a comparative analysis of these outcomes with those of students in traditional teacher preparation programs at Teachers College. Further, these comparisons will employ quasi-experimental, causal methods when possible. The formative evaluation consists of interviews with Teaching Residents (TRs), their Mentor Teachers (MenTs), and their Residency Supervisors and is meant to inform the ongoing design and implementation of the program.

I. Summative evaluation overview

The objective of the summative portion of this evaluation is to assess the level of student success and preparation within the **TR@TC³** program across a wide range of outcomes (including education and employment outcomes, program satisfaction, and teacher practice metrics), as well as to ask how outcomes of **TR@TC³** students (TRs) compare to outcomes of students in traditional Teachers College programs in the same fields. This evaluation will first include a descriptive analysis of educational and employment outcomes of residents of the program; we will then compare these outcomes to those of students in traditional TESOL, Science, Mathematics, or Inclusive Education programs at Teachers College (the focus areas of **TR@TC³**). Note that this comparative analysis is descriptive in nature (non-experimental).

For the analysis of student satisfaction, we will conduct both a descriptive analysis of self-reported satisfaction outcomes as well as a quasi-experimental analysis of teacher satisfaction, comparing those in the **TR@TC³** program to student teachers in traditional Teachers

College programs. This analysis will employ propensity score matching techniques. Finally, to assess teacher practice we will track teacher practice scores (through classroom observations) over time and compare these metrics to student-teachers in traditional programs of comparable subject matter. While this comparison will be non-experimental, the frequency by which these classroom observations are conducted will allow us to conduct an analysis of individual teacher practice over time or “within-teacher growth.” In addition, a widely used, self-reported teacher self-efficacy survey will be administered twice per semester to TR@TC³ students, allowing us to assess teacher growth and confidence across a number of criteria over time. The following table summarizes the type of analysis we will conduct on each set of teacher outcomes:

Table 3. Methodology Type for Each Set of Outcomes

	Overall Descriptive Data Analysis	Simple Comparative Analysis	Quasi -Experimental Comparative Analysis	Within-Teacher Growth Diagnostics
Educational & Employment Outcomes	Yes	Yes	No	N/A
Program Satisfaction / Preparation	Yes	Yes	Yes	N/A
Teacher Practice Metrics	Yes	Yes	No	Yes

A. Analysis of program educational and employment outcomes

The descriptive analysis of educational and employment-related outcomes will be conducted according to the reporting requirements outlined in the Federal Register and other associated documents. The evaluation will generate descriptive data on both short-term and long-term educational and employment outcomes, which include:

1. Educational outcomes: program persistence and completion/graduation rates; scores and pass rates on relevant state teacher certification exams; the percentage of participants who attain initial certification (within two years of beginning the program); and the percentage

of teachers trained on integrating technology and computer science into classroom practice.

2. Employment outcomes: first, second and third year rates of retention in high-needs settings in the partner LEA, and the percentage of highly qualified teachers who are: a) hired by the high-need LEA overall; b) members of underrepresented groups; c) teaching high-need academic subjects (science and mathematics in this case); d) teaching in high-need areas (e.g., special education or ESL programs); and e) teaching in high-need/high-poverty middle or secondary schools and schools in Opportunity Zones.

Methodology: The mean value of each of these outcomes will be compared to those of students in more traditional Teachers College programs (in the same fields). Independent samples t-tests of means will measure any statistically significant differences across groups. Again, this analysis is non-experimental in nature.

Data Sources: The TR@TC³ program has an individual tracking system in place to monitor the progress of program participants over time (both during the 18 months spent at Teachers College, the first two years of their “induction program” during which participants are employed (and mentored) in schools, and two years beyond this induction program). This tracking system will allow us to ascertain the percentage of program completers who persist in their respective programs, graduate from their programs, pass their New York State Teacher Certification Examinations, and who are retained in teaching within the New York City Department of Education or other high-need LEA’s one, two, three, and four years,¹ after initial employment. Moreover, we will be able to discern whether completers are teaching high-needs academic subjects, in high-needs areas, or in schools that are judged to be high-needs on the basis of factors such as the percentage of students eligible for free or reduced-price lunch and the

percentage of teachers teaching out of license. Data on comparison students (mean values for each outcome and the sample size and standard errors associated with that outcome) will be made available through the Office of Institutional Studies and the Office of Accreditation and Assessment at Teachers College.

B. Analysis of student satisfaction outcomes

In order to measure student satisfaction and preparedness for classroom teaching, Teachers College employs a school-wide survey of all enrolled students. Topics include student satisfaction in a variety of program areas: courses, faculty, student teaching experiences, advising, as well as students' sense of preparedness for classroom instruction. As this survey is administered to **TR@TC**³ students and non-TR@TC students alike, we will employ quasi-experimental methods to investigate to what extent student satisfaction differs between these groups.

Methodology: Specifically, propensity score matching techniques will be used to “balance” the **TR@TC**³ participants with a group of program non-participants who are similar in the aggregate. Thus, we will construct a comparison group as similar as possible to the “treatment” group on measured characteristics (such as undergraduate degrees and GPA's, undergraduate college selectivity, age, prior professional and work experience, gender, and racial/ethnic background etc.). Assuming that these groups are equivalent at the outset of the program, the true program impacts can be estimated by comparing the outcomes observed for the treatment and comparison groups.

After matching on the propensity score, it is important to check for sufficient “overlap” across participant and non-participant groups at each level of the propensity score, as well as for statistical balance on observable variables between these two groups. Poor overlap can be

improved by statistical techniques such as “matching with replacement” (i.e. using particular non-participants as matches more than once); there is also the option of combining cohorts to increase the sample size for the treatment and comparison groups. In order to improve the precision of the results, a regression adjusted model using these matched pairs is employed to estimate $[Symbol]_1$, the average impact of participating in **TR@TC³** on the outcome of interest:

$$Y_i = \beta_0 + \beta_1 Teacher\ Residency_i + X_i\phi + \epsilon_i$$

$$\epsilon_i \sim N(0, v_i)$$

where Y_i is the outcome of interest for individual i (e.g., student satisfaction with program faculty); “**TR@TC³**” is a dummy variable that is equal to 1 if a student participated in **TR@TC³** and equal to 0 otherwise; X_i represents a vector of student-specific background variables (including those upon which the propensity score was based), and $[Symbol]_i$ represents the error term, which is assumed to be normally distributed with variance v_i and mean 0.

Data Sources: Data will come from the Office of Institutional Studies (OIS) at Teachers College, which administers this bi-annual, school-wide satisfaction survey. The OIS will also provide demographic and background variables on all survey respondents to permit the use of a propensity score matching methodology.

C. Analysis of teacher practice outcomes over time

This portion of the evaluation examines to what extent residents are upholding high quality standards and employing evidence-based practices in their classroom instruction. For example, what percentage of teachers employ evidence-based practices over time, as measured through classroom observations ratings (described below)? And do teachers improve their teaching practice over the entire period of the **TR@TC³** program (this includes their 18 months at TC and the 2-year induction period)? Furthermore, is there a large degree of variation in the

take-up of these practices or in teachers' adherence to state standards? In addition, this section of the evaluation examines to what extent residents feel prepared for classroom teaching. For example, how prepared do residents feel to prepare lessons, differentiate material for different types of students, and manage a classroom?

Methodology: Teachers College administers school-wide student teaching evaluations for students involved in student-teaching assignments (all evaluations or classroom observations are conducted by trained supervisors). Using this data, we will be able to provide descriptive statistics on **TR@TC**³ students for all measured teacher practice outcomes. Teachers College's student teaching evaluation indicators are aligned with both INTASC (Interstate Teacher Assessment and Support Consortium, 2011) and New York State teaching (2011) standards. There are 17 indicators including "Demonstrates knowledge of subject matter/discipline"; "Demonstrates pedagogical content knowledge"; "Uses knowledge of learners in planning instruction"; "Uses questioning and discussion techniques"; "Engages all learners in learning"; and "Uses assessment in instruction," among others. Each indicator contains multiple descriptive criteria asking evaluators to give one of four ratings (1- Unacceptable; 2-Emerging; 3-Building; 4-Refining).

Next, we will be able to conduct a comparative analysis of teacher practice outcomes between **TR@TC**³ students and students in traditional TC programs within the same field. These analyses will not be quasi-experimental in nature (a propensity score analysis is not possible as we will not have access to student background variables in this case). We will thus employ independent samples t-tests of means between students in the **TR@TC**³ program versus those in traditional programs.

However, as this observation rubric is administered at least twice per student teaching period, we will also be able to measure within-teacher growth on these indicators. For **TR@TC³** students in particular, this rubric will be employed twice per semester, across all years of the program (including the two induction years), resulting in up to 12 observations in total. Thus, using this rubric to track instructional progress among **TR@TC³** residents will allow for a nuanced view of their growth in these areas over time.

In addition, we will employ the Teacher Self-Efficacy Survey (TSES), a validated reliable instrument meant to measure teacher self-perceptions of agency and readiness for the classroom.² The TSES asks teachers to assess their capabilities in regards to instructional strategies, student engagement, and classroom management. This instrument will only be used for **TR@TC³** students (no comparison group), and will be administered twice per year, starting with the residency year for a total of six administrations per resident. This self-reported data will be another way in which we will measure teacher instructional growth (and confidence in the classroom) over time. Note that any changes within an individual in either the classroom observations metrics or self-efficacy outcomes, cannot be attributed to the **TR@TC³** program alone, as changes reflect the experience of teaching itself as well as the program (in addition to other observable or non-observable variables that may have shifted with time).

Data Sources: Student teaching evaluations (classroom observation data) will come from the Office of Accreditation and Assessment, while TSES data will be collected by CPRE researchers. Teacher practice data will be collected twice per student on average, except for **TR@TC³** students whose classroom practice outcomes will be observed 12 times total (four times per year). TSES data will also be collected six times in total.

II. Formative Evaluation

The purpose of the formative evaluation is to inform the status of implementation and the effectiveness of the design of the program in producing high quality teachers in high needs schools in NYC. Research questions explored in this section include:

1. How do the Teaching Residents (TRs) reflect upon the course work required in the **TR@TC³** program? Do they think that their courses provide the theoretical background needed to understand new concepts as well as practical and pedagogical knowledge and skills?
2. How do the TRs reflect upon the structure and practices of the residency program and work with MTs? Are these program components useful to residents as they become teachers?
3. How do the TRs reflect upon the induction program? How do they work with IMens? How useful are induction mentors in helping novice teachers to grow and enhance their teaching practices?
4. How do the other actors within the program such as MTs, IMens and Residency Supervisors evaluate the program?
5. Are the major pillars of the program: 1) STEM+C Literacy and Enrichment, 2) Instructional, Digital and Assistive Technologies, 3) Universal Design for Learning and Inclusive Curriculum, and 4) Co-teaching and Co-planning across STEM+C, Special Education and English as a Second Language, implemented as envisioned?

A. Analysis of the TR@TC³ program design and implementation

All research questions will be addressed through our analysis of qualitative data collected from multiple interviews with teaching residents, mentor teachers, induction mentors, and

resident supervisors as described below. Also, please see Table 4 (below) for the timeline of data collection.

Data Sources:

- *Teaching Resident Interviews:* Teaching Residents (TRs) will be interviewed twice during their student teaching program and at the end of every induction year. The first interview, to be conducted at the start of student teaching, will ask about their experiences in the program including course taking, readiness to be in classrooms and their communication (and knowledge exchange) with their supervisors and mentor teachers. In the second interview at the end of student teaching, TRs will be asked about their thoughts on their student teaching experience, their working relationships with supervisors and mentors, the Core Integrating Seminar (CIS), and their reflections on the program as a whole, including the program's strengths and weaknesses. Interviews III and IV, at the end of each induction year, will ask about their experiences in the induction program and their reflections on being new teachers in high-needs schools.
- *Mentor Teacher Interviews:* Mentor Teachers will be interviewed twice during their mentoring of TRs regarding their perceptions of the quality of the training of TRs, their working relationships with TRs, as well as the program's influence on their own teaching.
- *Residency Supervisor Interviews:* Supervisors will be asked about their perceptions of the quality of the training of TRs and TRs' growth in instructional practices, as well as their impression of the implementation of the **TR@TC³** program overall. Interview questions will also cover any issues that TRs may experience during their student teaching placements in the realms of classroom management, TRs' content knowledge, or TRs' working relationships with other teachers in their school.

- *Induction Mentor interview:* Induction Mentors will be asked about their perceptions of the quality of the residents at their school and their thoughts on the program at the end of each year of induction.

Methodology: The data from these interviews are confidential and will be de-identified (individuals will receive ID numbers). In all reporting, individuals will be referenced in the aggregate or by their role (as Residency Supervisor, Mentor Teacher, TR etc.) but will not be identifiable (no names, school placement names, or other identifying information will be provided). These interviews will be transcribed and stored in *ATLAS.ti*, a qualitative analytical software, which is password protected on our secure server at Teachers College. Only research team members who have had CITI research training will be able to access to the data.

Using a grounded theory approach, a coding framework will be developed to highlight common themes within the interviews. These themes will then be assigned to various structural aspects of the program such as course-taking, student teaching experiences, mentoring and program implementation, as well as to the four pillars of the program. The coding scheme will be modified as necessary, as this is often a dynamic process. This analysis will be conducted for all interviews, including those with residents, mentors and supervisors of the program. In addition to the interviews, classroom observations of residents will be conducted to understand the classroom environment of residents’ placement schools and to observe the residents working relationships with their mentor teachers. These observations are meant to contextualize the interviews but will not be used as data for evaluation purposes. Finally, the formative evaluations conducted by CPRE will be submitted to the TR@TC program annually to help inform any programmatic decisions or changes from year to year.

Table 4. Timeline for Data Collection

	SP - 2020	FA - 2020	SP - 2021	FA - 2021	SP - 2022	FA - 2022	SP - 2023	FA - 2023	SP - 2024
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Cohort I	Courses Begin	TR Int. I MT Int. I	TR Int. II MT Int. II SUP Int. I	Induction Year 1		Induction Year 2			
					TR Int. III IM Int. I		TR Int. IV IM Int. II		
Cohort II			Course Taking Starts	TR Int. I MT Int. I	TR Int. II MT Int. II SUP Int. I	Induction Year 1		Induction Year 2	
							TR Int. III IM Int. I		TR Int. IV IM Int. II
Cohort III					Course Taking Starts	TR Int. I MT Int. I	TR Int. II MT Int. II SUP Int. I	Induction Year 1	
									TR Int. III IM Int. I
Cohort IV							Course Taking Starts	TR Int. I MT Int. I	TR Int. II MT Int. II SUP Int. I

Note: TR Int. =Teacher Resident Interview; MT Int. = Mentor Interview; SUP Int. =Supervisor Interview;
IM Int. =Induction Mentor Interview.

Section III: Management Plan

To ensure that the objectives of the proposed project are achieved on time and within budget, we have made careful decisions about personnel needs, feedback mechanisms and milestones that will provide a structure for ongoing communication and assessment, the scope and sequence of activities and the marshaling of resources in addition to the funds requested.

Project Personnel.

A project team will assume major responsibility for the implementation and management of the project. This team will include both full- and part-time personnel, as well as several current TC staff.

The PI for the project will be [REDACTED], Professor of Education, who will assume the role of Director. [REDACTED] is an internationally-known teacher education scholar who began her career teaching K-12 in general and special education. She has extensive experience in teacher preparation, both as a professor and as an administrator, and has conceptualized and successfully implemented several funded, multi-year projects, aimed at improving and diversifying the teaching force, including TR@TC and TR@TC2, TC's first and second residency program iterations supported by 2009 and 2014 TQP grants.

[REDACTED] is currently the full-time Co-Director for TR@TC2. [REDACTED] began her career in general education and TESOL, teaching in elementary and secondary settings. With TR@TC, she served as both Residency Supervisor and Induction Mentor and with TR@TC2 has also held the positions of Induction Coordinator and Project Manager. In her current position of Co-Director, she is responsible for bringing the project from conceptualization to implementation. As Co-Director, [REDACTED] acts as the glue between the various partners and components of the project, taking responsibility for creating the structures needed for monitoring, coordinating, and overseeing the activities that will support ongoing communication between partners, both as a whole and as constituent or task groups. In addition, [REDACTED] will be responsible for leading the design, coordination and instruction of the Spring I Foundational course, Intensive Summer Institute, and Fall and Spring II Core Integrating Courses for the program. She will continue with TR@TC³ at 100% time.

A full time Fieldwork Coordinator—to be hired—will be responsible for the recruitment, selection, training, professional development and support of all Mentor Teachers and Residency Supervisors and will utilize program documentation and data to inform this work. Selection criteria for this position include a keen understanding of NYC or urban public schools, deep

knowledge of teaching youth in urban environments, and the ability and experience to support teachers in all phases of their development as practitioners and mentors.

██████████ is currently the full-time Induction Program Coordinator for TR@TC2. This position oversees the recruitment, selection, training and professional development of Induction Mentors and professional development of graduated Teaching Residents. ██████████ is an experienced teacher who also has experience mentoring new teachers in a classroom setting. Given her relevant experience, she has done an exceptional job with the induction component of the project and has taken the program in creative and very productive directions. She will continue with TR@TC³ at 100% time.

The project team will also include: (1) ██████████, Director for the Office of Teacher Education (OTE), who will devote 45% of her time to administering project budgets, ensuring fiscal fidelity, handling all reporting requirements, and the selection and hiring of full time program staff; 2) ██████████, Associate Director for School-based Support Services who will allocate 25% of her time to TR@TC2 to assist in the recruitment and selection of full time program staff; 3) ██████████, Associate Director for Certification Compliance, will allocate 15% of her time to ensure that TRs understand and meet all certification requirements, and provide guidance in finalizing the registration of new dual certification programs with NYS; 4) program secretaries from the four teacher education partner programs will provide individualized support to TRs as they navigate the logistical requirements associated with respective programs. They will each allocate 10% of their time to support the TRs.

██████████, Research Scientist with CPRE has assumed responsibility for the project evaluation, and designed the evaluation plan described in the narrative. She has extensive

experience in executing qualitative and quantitative studies on mathematical teaching, students' thinking, professional development and quality instruction.

A second CPRE research scientist—to be hired—will collaborate with [REDACTED] on the evaluation, especially taking lead in the quantitative portions of the study. Neither [REDACTED] nor the to-be-determined researcher will be engaged with any program at TC, and will not be involved in TR@TC³ daily operations, nor have any substantive role in the program beyond the evaluation. Thus, they can conduct the evaluation as objective, but informed, experts.

Contributing Collaborators

Research tells us that high-quality teachers are a vital element in supporting strong student learning. To support residents in developing the range of knowledge and skills necessary to eventually provide rich and responsive opportunities of learning for their own students, TRs will have the privilege of learning from TC faculty who are well known for their expert teaching, scholarly productivity, and their work in urban settings. Some of these faculty members include:

- Professor [REDACTED] is a mathematics teacher educator who brings expertise in theoretical and mathematical problem solving, mathematics teacher education, and gifted education.
- Professor [REDACTED], is a science teacher educator who brings expertise in culturally responsive science teaching and curriculum; science teaching as achievement, access, empowerment, opportunity; and urban multicultural teaching.
- Associate Professor [REDACTED] of psychology, directs the programs in Intellectual Disability/Autism. She has extensive expertise in the social-emotional well being of high-need children and families, as well as the development of self-regulation in normative

and non-normative contexts, including those marked with development and social-ecological risks.

- Lecturer and TESOL Program Director [REDACTED] brings a wide-range of knowledge and expertise in language development and pedagogy in ESL contexts.

Beyond Teachers College faculty, TRs will also have the opportunity of learning from leading educators and experts in their fields who have committed to the **TR@TC³** partnership.

Some key collaborators include:

- [REDACTED], Director of Outreach Programs and Special Projects, The Fu Foundation School of Engineering and Applied Sciences, will act as liaison between **TR@TC³** and the College of Engineering. Her role is to help further the mission of the School of Engineering by connecting engineering faculty and staff with K-12 schools in NYC. This will be the role that she plays in our collaboration as well, as we work to establish and enhance STEM+C programming in partnering schools.
- [REDACTED], Director of Environmental Stewardship for the Bronx River Alliance, has over ten years of experience leading adults and school groups through creeks and natural areas, managing ecological monitoring programs, and teaching about environmental science and sustainability. She holds advanced degrees in Geography, Conservation Ecology & Sustainability Development, and Environmental Conservation Education.
- [REDACTED], Director of the Pre-Law Institute and Center for Post-Graduate Opportunities at JJC, has worked on a wide variety of projects including the Civic Education Project, Open Society Foundation (Budapest), the Ford Foundation, USAID, and others. In addition to his collaborative work on establishing our *Pathways to*

Teaching program, [REDACTED] offers a wide-range of expertise that is relevant to the development of our *TR@TC Global Citizen* program.

Mechanisms of On-going Communication and Feedback

The complexity of **TR@TC³** requires multiple structures that are designed to support continuous and transparent communication, mutual problem-solving, and timely feedback for the purpose of refining and improving the program. These structures will be embedded into the structure of **TR@TC³** from the beginning in order for them to naturally integrate into the rhythms of the program's working processes. The most important structure will be regular meetings that are designed to carve out defined and planned-for space for partnership members to come together. First, the project team will meet weekly to ensure smooth functioning of all program components, address both instructional and administrative concerns, and make sure that team members are all on the same page in terms of issues, changes, policies, and finances. Second, a team of TC faculty representatives from each of our partnering programs will meet on a monthly basis. These meetings will be especially important in the first year of the program as we establish processes for identifying and meeting the needs of TRs as they participate in these new dual certification pathways. Third, a Steering Committee will assume responsibility for program policy and general oversight. This committee will meet a minimum of twice a year and will be representative of partnership members (school-, community-, and university-based), and will also include project team staff. At least one TR graduate from each of the **TR@TC** cycles, an IMen, and, in later years, a TR graduate from **TR@TC³** will also participate on the committee. Next, the Teacher Education Policy Committee at TC, which meets twice each month, will also be engaged in assessing program progress with particular attention to TRs' experience, curriculum and instruction in the program and to lessons applicable for other teacher education

programs at TC and beyond; [REDACTED] sits on this committee. Finally, the program will host an annual retreat for all partnership members—Administrators, MTs, TRs, Residency Supervisors, TC faculty, IMens, TR alumni, College of Engineering personnel, JJAY personnel, Bronx River Alliance personnel, and district network representatives. During the retreat, participants will a) reflect on the year and evaluate all aspects of the program; b) attend professional development and re-tooling workshops; c) engage in collective analysis and solution of problems raised by participants or the evaluation; and d) participate in collective program planning according to needs identified by the evaluation and by partnership schools. Meaningful improvement cannot occur in the absence of assessment, and the retreat will provide a formal structure that fosters self-examination and a careful analysis of accomplishments against needs for the purpose of moving both the program and teachers forward. The retreat will also provide an opportunity to examine program progress in relation to the annual milestones we set for each cohort; recruitment, program completion, graduation and certification, and completion of two induction years/retention in the profession.

Section IV: Significance

Affecting System Change and Improvement

TR@TC³ promises to build upon and extend the accomplishments of TC's previous residency programs, TR@TC and TR@TC2. Given the track record we have established and our achievement of program goals, we feel confident that **TR@TC³** will continue to make a significant impact on teacher preparation and teaching quality for NYC by:

Increasing the recruitment of high quality teachers for high-need schools. The Program will maintain a sharp focus on the single biggest influence on student learning—the quality of teachers. As demonstrated by its previous residency programs, TC has been successful

at bringing fresh talent and energy to the consortium of high-need, high poverty schools in NYC. Surveys of hiring administrators (several of whom were from partnership schools) showed that at the end of TRs' first year of teaching (2012-2013 and 2013- 2014), 79% and 100% respectively rated TRs' ability to make a difference in student learning as good or excellent; 84% and 100% would hire a TR if given the opportunity. Administrators whose schools hosted residents during that period expressed equally positive views about TRs—100% and 75% respectively rated TRs' ability to make a difference in student learning as good or excellent; the same percentage would hire a TR if they had the opportunity. These data are all the more noteworthy given common knowledge of the challenges teachers face in their first year in the classroom, resulting in high attrition rates, particularly among those teaching in high need, urban schools (Ingersoll, 2004; Pallas, & Buckley, 2012). Sample comments from administrators are illustrative:

- The teachers that are the residents who have finished the program are extremely prepared and highly qualified for taking on the challenge of teaching in an urban area. (2011-2012)
- [The TR I hired] is an outstanding teacher. His strongest suit is his ability to relate to students in a nurturing yet professional manner. This makes him the perfect teacher for an urban school. He's well prepared and uses effective teaching strategies in daily teaching. His preparation has contributed to his ability to excel during his first year teaching in areas where many new teachers struggle. We are very fortunate to have him. (2012-2013)
- We love the TR@TC Program because it truly prepares its candidates for success in the classroom by providing them with a mentor and valuable classroom experiences (2013-2014)

Increasing the retention of high quality and experienced teachers in high-need schools through quality induction support. The retention rates of TRs are a clear indicator of the quality

induction we have been able to deliver. 89% of graduates were still teaching at the close of their third year, with all indications that they plan to continue. This contrasts sharply with data that show that up to a third of new teachers have left the field by year three (Ingersoll, 2003) and that high-poverty, urban public schools turn over, on average, a fifth of their teachers annually (Ingersoll, 2004), a turnover rate higher than all other types of schools (Ingersoll, 2011; Simon & Johnson, 2013). Retaining quality teachers in the classroom is a clear priority for high-need schools and induction programs can be critical to retaining new teachers in these schools (Humphrey et al, 2000; Ingersoll & Strong, 2012; Simon & Johnson, 2013; Smith & Ingersoll, 2004). The **TR@TC³** induction program will continue to be informed by research indicating that induction focusing directly on teachers' classroom responsibilities and realities have the greatest impact on teacher retention (Dove & Honigsfeld, 2010; Fletcher, Strong, & Villar, 2008; Simon & Finch, 2010; Smith & Ingersoll, 2004). The program also has the benefit of proven strategies gained from TC's previous residency experiences to ensure TRs possess the critical competencies needed to handle the challenges of urban classrooms and thrive as teachers.

Broadening and deepening the knowledge base for research and practice in urban classrooms. Urban high-need classrooms boast a rich diversity of students who vary in their racial, ethnic, linguistic, developmental, and academic abilities. Empirical evidence of the impact of residency programs on academic outcomes for diverse students remains nascent. **TR@TC³** is essential in connecting the pedagogical expertise of faculty at TC with the invaluable knowledge of classroom practitioners. Program faculty from three TC departments and the Columbia University School of Engineering will actively work with MenTs across discipline and grade-level boundaries to examine, evaluate and apply insights afforded by TRs' experiences in the field. Such collaborative inquiry will inform teaching and research on ELLs, subject matter

knowledge, pedagogical content knowledge, language acquisition, differentiated teaching and learning, among others. **TR@TC³** also provides a valuable opportunity to learn from successful residency programs, i.e., to apply prior knowledge and experience from TC's previous residency experiences in order to scale up and replicate best practices and proven strategies. In so doing, **TR@TC³** will enrich the knowledge base for research and teaching undertaken at the College and enhance TC's contribution to the national discourse and policy-making on educating urban youngsters to meet high standards.

Informing and building local capacity. Successful university-school partnerships can change the life course for students in high poverty communities and at the same time strengthen the mission and reputation of the university (Rodin, 2007). **TR@TC³** will continue to support MT learning and growth through high-quality professional development, leadership opportunities, and professional learning communities. Participating schools will benefit from access to university resources and from working with school- and university-based educators to shape teacher preparation. They will participate in research and learn from evaluations, which will expose them to cutting edge thinking and new ideas. Of particular interest will be data the program will collect on the intersection of STEM, ESOL and special education in teacher preparation and its impact on student learning. These data will be particularly meaningful and relevant to NYC principals given the system-wide special education reform underway with its focus on inclusive classrooms and full access to the academic curriculum for all.

Improving outcomes for diverse learners through an integrated approach to instruction. Large proportions of the NYC student population receive special education services and are designated ELL and/or learning disabled (Thomas & Collier, 2002). NYC is immersed in special education reform that aims to educate ELLs and students with disabilities “to the same

level as their non-disabled peers” in least restrictive environments and to increase graduation rates and the number of students who earn regular high school diplomas (Fund for Public Advocacy, 2012). General education teachers will be working increasingly in inclusive classrooms and co-teaching/planning with their special education and ESOL teacher colleagues, but few teachers feel prepared to adequately meet these multiple needs (Darling-Hammond, 2002; DeSimone & Parmar 2006). **TR@TC³** steps up to these needs head-on through a program of comprehensive and customized support for Science, ESOL and TSWD teachers. The integrated curriculum will build teachers’ confidence—TRs as well as their mentors—in teaching content, applying specialist knowledge, collaborating with peers, and responding flexibly to complex and diverse needs.

Student achievement. The causes of achievement gaps between advantaged and disadvantaged students are numerous and complex, but within schools, teachers impact the learning of students more than any other factor including facilities, curricula, class sizes, funding, etc. (Chetty, Friedman & Rockoff, 2013; Goldhaber & Anthony, 2007; Hattie 2003). However, students from the most disadvantaged backgrounds are often taught by the least qualified teachers as measured by years of experience, certification level, and performance on standardized tests of general and teacher knowledge (Clotfelter, Ladd, & Vigdor, 2004; Corcoran, 2007; Darling-Hammond, 2000; Lankford, Loeb, & Wyckoff, 2002; Stullich et. al, 2007). Following the trajectory of its predecessor residency programs, **TR@TC³** will bring certified, experienced, knowledgeable teachers to schools where the achievement gaps are especially pronounced. High quality teachers can make a significant impact on student achievement in just a single school year (Chetty, Friedman & Rockoff, 2013; Hanushek, 1992; Kane, Rockoff, & Staiger, 2007). Furthermore, **TR@TC³** graduates will reach ESOL and

students with disabilities who are especially at risk of under-achieving because teachers are usually ill prepared to incorporate them into the general education classroom.

Teacher achievement. Some student teaching requirements for university-based programs are as short as seven weeks; most are rarely longer than a college semester. New entrants to the field are subsequently overwhelmed and unprepared for urban classroom realities. In contrast, **TR@TC³** residents will have embedded time in classrooms four days a week and familiarity with several different schools, affording them a deep and well-rounded experience. They will learn from veteran teachers, and be members of close-knit cohorts that will help them study, teach and reflect. In addition, MenTs will become skilled teacher educators whose work complements the Residents' coursework and builds local capacity.

Saving money. Researchers calculate that taxpayers pay between 25% and 200% of the annual salary and benefits of a teacher who leaves. The cost of attrition of first-year teachers in NYC alone is about \$21 million, or \$13,200 per teacher lost (UFT, 2013). The 95% retention rate of TC's first residency program equals savings of over one million at the end of graduates' first year—savings that have only increased as the majority of TRs have remained in teaching for three, two and one years thus far. **TR@TC³** will prepare another 75 highly qualified teachers for its LEA. Extrapolating from the track record of our first program, **TR@TC³** will save a minimum of well over million dollars at the end of teaching (induction) year one alone. Ultimately, this project will produce 75 high quality teachers and so much more. The significance and potential impact of **TR@TC³** must be considered in the context of TC's positive history with designing and implanting a teaching residency program, the high quality teachers we have already prepared who are currently—and competently—serving in high need NYC schools, and the college's capacity, capability and mission to research and further advance new

knowledge about innovative approaches to teacher preparation. **TR@TC**³ is designed to be generative in nature, so as to qualitatively impact and reshape what we know about preparing quality teachers and about achieving excellent outcomes for students who have been underserved and left to lag behind, but who absolutely need and deserve more.

Our partnering LEA district network is part of the New York City public school system which operates as the largest school system in the U.S., serving 1.1 million students in approximately 1,800 schools taught by 75,000 teachers (<http://schools.nyc.gov>). About 85% of NYC public school students are racial/ethnic minorities, with Latino students accounting for just over 40% of the total (NYCIBO, 2013). Poverty rates in NYC are high such that in 2016-17, 71% of K-12 students in NYC received free or reduced price lunch, a likely under-estimation of the actual poverty rate “because there is a tendency among students at the junior and senior high school levels not to apply” for this support (Council on Children and Families). Immigrants make up a steadily rising proportion of the school population and speak 160 languages in NYC schools (Office of English Language Learners, 2013). With more than 20,000 students in grade 3-8 entering NYC schools as newcomers in 2016-2017, increased numbers of teachers who are able to support these students is needed. These overarching statistics are representative of those experienced within our partnering LEA district network as well as outlined in Table 3.