

THE CASE STUDY PROJECT

Clinically Oriented Teacher Preparation



Despite a growing body of evidence that a practice-based approach is the best way to prepare teachers, few studies to date provide tangible insight into how to move toward a clinical model. With the release of *Clinically Oriented Teacher Preparation (COTP)* in 2015, the National Center for Teacher Residencies (NCTR, formerly UTRU) set out to illustrate what preparation programs actually do as they transition to a clinically oriented approach; what the move toward practice-based preparation looks like; and what can be learned from programs across the nation that are transitioning to clinically oriented teacher preparation.

Key Shifts

COTP identified three key shifts that programs often experience as they implement clinically-focused teacher preparation:

- **RETHINKING** the nature of the clinical experience by positioning teacher candidates as co-teachers; emphasizing candidate performance and accountability through a focus on key competency-based assessments and the use of district or state-aligned evaluation tools; increasing mentor selectivity; focusing on mentor development; and devising new, clinically based roles to accommodate programmatic changes;
- **REIMAGINING** coursework, pedagogies, and pathways to program entry including tightening theory-to-practice integration; using simulations and rehearsals; and designing unique routes to program entry that attract individuals into the profession who otherwise might not consider teaching as a career possibility; and
- **FORGING** authentic partnerships and collaboration between and across schools, school districts, and institutes of higher education, underscoring the importance of collaboration and shared mission, vision, and goals.

The COTP Case Study Project (CSP) takes an in-depth look at the opportunities and challenges programs face as they instantiate each key shift. Through three case studies, NCTR digs more deeply into the lessons learned from and the struggles inherent

in transitioning to a clinical model. Each case study examines a program's journey through shift implementation, and can assist programs and institutions undertaking the important task of designing high-quality, clinically based teacher preparation aligned to the core components of the teacher residency model.¹

The case study sites were selected due to the considerable emphasis each placed on one of the three shifts identified in the original COTP report. Data was collected for each case study through site visits and observations of key residency activities, in-person and telephone interviews, and document review.

Rethinking the Nature of the Clinical Experience

THE FIRST CASE STUDY, *Designing Sustainable Clinical Programs: A Study of the Heritage University (HU) Residency Program*, examines one program's attempt to rethink the nature of the clinical experience. In seeking to understand HU Teacher Residency's² redesign efforts through a focus on competency-based assessments, new mentor-novice structures in the field, and innovative clinical support roles, investigations revealed a compelling story of a struggle for sustainability.

Reimagining Coursework, Pedagogies, and Pathways to Program Entry

THE SECOND CASE STUDY, *Building STEM Teaching Capacity in Novice Teachers: A Case Study of the MASTER Teacher Residency*, investigates how the New Visions for Public Schools-Hunter

schools in New York City.

Forging Authentic Partnerships

THE FINAL CASE STUDY illuminates the ever-elusive challenge of establishing deep and long-lasting partnerships between higher education institutions and school systems to meet the needs of the students and communities served. *Developing an Authentic Partnership to Transform a District's Human Capital Pipeline: The*

a program serving students in the fourth largest district in California while simultaneously improving both the district and the university's approach to preparing new STEM teachers.

All three programs featured in the *COTP Case Study Project* implement the residency model differently; however, each offers important insights into the design considerations and challenges that must inform the work of shifting to a clinical approach to teacher preparation.

Designing Sustainable Clinical Programs



In 2010, Heritage University, located in rural Toppenish, Washington, set out to transform its teacher education program. Historically, Heritage's elementary education majors completed a series of classes and one semester of student teaching. Little coordination existed between coursework and fieldwork, and, overall, student teaching represented a very brief opportunity to spend time in classrooms. Heritage felt that its program, in many aspects, reflected the critique levied against many teacher education programs — a university experience with relatively brief clinical training that was disconnected from the realities of teaching.

Consequently, the university decided to design a program focused on preparing teachers to teach students in the surrounding central Washington area — a region marked by high poverty with a large percentage of English language learners. Heritage teacher education staff knew that clinical preparation, along with intentionally designed time in the field, would be a key aspect of their program redesign efforts. With the help of a five-year innovation grant from the U.S. Department of Education, HU105, now known as the HU Teacher Residency, was born. Heritage partnered with the Educational Service District 105 (ESD105), a regional education center serving central Washington state, and together they designed an innovative teacher residency program.

The HU Teacher Residency is a one and a half to two-year clinically focused program.³ Residents receive elementary teaching certification while also receiving an endorsement in teaching English Language Learners. While residents are in the program, they spend four days a week in classrooms and attend classes one day each week. Residents work in schools throughout the Yakima Valley, an area of central Washington plagued by endemic poverty. By preparing classroom-ready teachers to meet the challenges of the Yakima context on day one, the program has gained enormous respect in the community and has become the teacher-training pipeline of choice for school leaders over the past five years.

To launch and fund operations of the residency for the first five years, Heritage University and ESD105 were awarded a \$9 million federal Teacher Quality Partnership (TQP) grant. From the outset, the residency program was about innovation, and the residency staff had wide latitude in program design. When the TQP grant ended in August 2015, the residency program transitioned from a grant-funded to a university-funded residency program — a transition that presented many challenges. As such, this case study has two important and seemingly competing foci: unpacking the innovative clinical teacher residency program that Heritage designed and implemented beginning in 2010, and understanding the sustainability challenges the residency now faces. By closely examining key innovations along with the challenges that need to be negotiated for program sustainability over time, the study can assist others interested in undertaking similar efforts.

PART I

Celebrating Heritage's Innovative Clinical Program

When HU Teacher Residency and ESD105 staff received the TQP grant, they had the opportunity to reimagine every part of the teacher training experience. While the residency has evolved

- **TEACHING AND LEARNING TEAMS:** Heritage residents are part of a team of up to three residents who work in a classroom with support from one core teacher.⁴
- **SITE ADVOCATES:** Site advocates work in the field to support core teachers, residents, and school leaders to ensure alignment between coursework and the clinical experience. Each school has one or more site advocates, who visit their assigned sites multiple times each week for formal and informal meetings to ensure program success. Site advocates also teach residency courses in order to connect fieldwork to coursework.
- **FOCUS ON COMPETENCIES:** Heritage coursework is focused on competencies. Residents are held accountable to competencies as part of the requirements for program completion.

Teaching and Learning Teams

The concept of Teaching and Learning Teams (TLT) was born out of a desire to provide a strong and multi-faceted support system as residents become well-prepared beginning teachers. Whereas most preparation programs pair student teachers with one mentor teacher, each TLT is composed of three residents and one core teacher who work collaboratively in the same elementary classroom. Residents are part of a TLT for each of the three semesters they are in the program; this means that TLTs consist of residents who are at various stages of development in their teacher training, spanning from the first to the third (and final) semester. The composition of a TLT changes each semester, as third-semester residents graduate and new residents rotate in. While the obvious benefit of a TLT is that multiple adults are present to support student learning — thus allowing for significant differentiation and small group instruction — Heritage is committed to the TLT model for additional reasons as well. These become evident as we explore the experience of Hannah, a residency program graduate who now teaches kindergarten in the Yakima Valley.⁵

The TLT structure allows novice teachers to explore multiple instructional arrangements. Being in the TLT, Hannah explained, allowed her to teach in many different ways. In a single semester

the core teacher model a lesson and then teach the same lesson to different students in a later class period,” Hannah adds. The flexibility offered by having multiple adults present enabled Hannah to cover a lot of terrain in one semester, thus providing deep and broad learning opportunities.

TLTs explore data together. In her current kindergarten classroom, Hannah confidently uses data to guide her day-to-day planning. She credits her experience using formative and summative assessment data in TLT meetings to analyze student learning and drive instructional planning. Exploring data in a TLT means that multiple individuals explore the same data daily, and that TLT members have the opportunity to challenge each other, work through potential biases and entertain different hypotheses about each student’s progress. This forces residents and core teachers to challenge their own assumptions and look at the data through multiple lenses. Hannah feels that this collaborative approach made her a savvy data user, even as she now has to make sense of her class data on her own.

TLT planning sessions allow residents to learn use data proactively — using it to drive day-to-day instructional decision-making as well as long-term planning. For example, a TLT might collectively look at student responses to an exit ticket prompt. While the lesson might have been taught by a resident or co-taught by multiple TLT members, the entire team reviews the student responses. Collectively, the TLT determines which students understand the core lesson concepts and are ready to move forward, and which students need additional one-on-one instruction. Decisions about differentiated instruction, then, are grounded explicitly in student data.

TLT members learn to be part of a professional learning community focused on student learning. Hannah loves that she learned how to participate in a team of professionals working together to maximize student learning through her residency work and especially as part of a TLT. This prepared her to be a leader in her professional learning community in her current job. Each week TLTs meet together, sometimes with a site advocate, to plan for the following week. In these planning sessions, TLTs operate as their own professional learning community —

potential challenges and gaps, and distribute the teaching load. Both core teachers and site advocates, when interviewed, note how important this planning process is for improving the nature of the day-to-day instruction that students receive. The TLTs transform day-to-day instruction as multiple adults work carefully and collaboratively to ensure that all students are learning.

One criticism of the TLT structure is that residents do not learn to teach alone. But Hannah says she felt extremely prepared to be in her own classroom. She notes, *“Had I not had the experience with the program, I wouldn’t have been prepared for being a first year teacher. I can honestly say I have never felt like I was drowning — swimming and swimming hard, for sure. But the residency program mirrored the realities of the teaching life.”* Core teachers also note that each resident has multiple opportunities throughout a semester to serve as lead teacher for the day. Thus, TLT members believe that the benefits of learning to teach in collaboration with other residents and a core teacher outweigh any potential downsides to the arrangement.

Site Advocates

When designing the HU Teacher Residency, leaders aimed to create a role that could respond to the oft-cited criticism that a huge disconnect exists between the work of universities and the work of schools. The site advocate attends to the elimination of this disconnect. Site advocates visit school sites at least once weekly to work with core teachers, residents, and school leadership. The goal of the site advocate’s work is to act as a liaison between the schools and university to identify successes and challenges, troubleshoot problems, and clarify and establish action plans that help ensure that residents become excellent beginning teachers. Site advocates also teach the various courses that the students are enrolled in, ensuring that the coursework and the school work are well integrated. In short, the site advocate role serves as a vehicle to constantly monitor resident learning and the complex ecosystem in which this learning is taking place.

Site advocates provide numerous lines of guidance for each TLT and its individual members. They also support core teachers

residency, I don’t know how you could expect good work without the site advocate. The bond among the site advocate and candidates and core teachers grows over time. I not only mentor the candidates individually, but I mentor the core teachers and problem-solve with them. Their practice sharpens as a result.” A majority of site advocates are teacher leaders and/or well-respected educators who previously taught in schools served by the ESD 105.

Professional Competencies Assessment Instrument

Since its inception, the HU Teacher Residency program has been guided by the idea that residents must be able to demonstrate proficiency in key competencies learned through practice in order to graduate. To facilitate this, program faculty created the *Professional Competencies Assessment Instrument (PCAI)*, a tool that allows Heritage to document resident competence on areas deemed critical for student success in the Yakima context. The PCAI’s design was guided by commonly used teacher assessment frameworks including Danielson’s Framework for Teaching, the Marzano Teacher Evaluation Model, and CEL 5D+ Teacher Evaluation Rubric (a framework designed by the University of Washington Center for Educational Leadership).

Residents are held accountable to the PCAI through observations by site advocates as well as their own core teacher, and must meet specific competency standards at various intervals throughout their residency year. Currently the PCAI has more than 100 competencies, the volume of which has become a challenge for core teachers, residents, and site advocates; it will be revisited as program leaders work to redesign the curriculum moving forward.

Part II

Understanding Heritage’s Sustainability Challenges

While the HU Teacher Residency is rife with innovation, strategic planning for long-term sustainability did not begin at program inception. Although all involved stakeholders assumed that the

a close in 2015, Heritage had to quickly identify how to continue pursuing the key goal of the project — transforming the teacher education pipeline in the Yakima Valley — after funding ceased. It became clear to members of the leadership team that if the program were to continue, it needed to be operated and funded directly by the university.⁷

Having a grant-funded residency meant that the program was able to “grow up” outside of the boundaries of the university. For example, instead of traditional courses, residents were held accountable to specific competencies. Course content could emerge based on the identified needs of residents, and the traditional university metric of “seat hours” was not a constraint. Without traditional syllabi and course names, however, residents lacked a transcript that allowed them to transfer to another university or receive certification in another state. Transcripts for residents who wished to pursue a master’s degree after completing the program did not document the classes they took; rather, they listed a generic block of credit hours with ambiguous labeling (e.g. Professional Competencies).

Additional challenges came to light as program operations and funding transferred to the university. While designing the original program outside the confines of the university allowed the residency to be innovative and nimble, it also meant that the residency operated with almost no interaction with the school of education. Site advocates spent intensive time in schools and classrooms while also serving as the only course instructors that residents experienced. While their time in the field allowed them to develop coursework responsive to classroom-based needs, the residency pathway became an increasingly siloed program, largely staffed with individuals who had no affiliation or interaction with the university.

In the transition to a university-funded program, Heritage’s School of Education leadership has had to make several difficult decisions to address these and other sustainability challenges. Although many of the changes have yielded benefits for the program and its residents and faculty, some have had negative consequences. The transition has not been without tension, and some

between the residency program and the school of education, Heritage leadership instituted a formalized entry process for all teacher preparation pathways offered by the university. Candidates interested in the residency now apply directly to Heritage to pursue one of three certification paths — the HU Teacher Residency, HU Accelerate, or Theory to Practice route. Candidates need to make clear which path they wish to pursue, and must demonstrate university-determined criteria for entry into each. All credential routes are also now held to the same standards and coursework, a shift discussed in more depth below.

All Heritage faculty teach all Heritage students. Before the university funded the residency program, Heritage faculty did not teach residents. This disconnect, as aforementioned, created problems on multiple levels. Now Heritage faculty teach all students in all of Heritage’s teacher education pathways, a shift that has increased coherence across the school of education. For example, school of education faculty recently collaborated to modify and standardize a lesson planning template to focus on areas that all university candidates had historically struggled with (e.g., the use of academic language); this single planning template now spans all pathways.

Heritage faculty are connected to both the field and the university. Initially, Heritage faculty did not have an intentional ongoing connection to the K-12 world as part of their work as teacher educators. Original residency program faculty, by contrast, had a strong connection to the field but often no link to the university even though they taught residents’ courses. Now the majority of Heritage’s education faculty is connected to the field in the role of mentor or site advocate. This new structure enables instructors to see the applicability of their coursework to the work that residents and other teacher candidates do in classrooms. Program leaders note that this shift has influenced hiring decisions; ideal faculty candidates are content specialists who are also very comfortable being in the field working with K-12 students and school leaders.

Heritage residents now complete specific courses. For the first five years of the program, residents did not take specific

ing resident competency through practice, it did not uniformly ensure that they learned the specific content required for licensure by the state of Washington. Introducing specific coursework allowed for the standardization of competencies and performance assessments across courses, and helped to ensure that residents have a more traditional transcript should they need to transfer to a different program.

As this transition has occurred, maintaining the PCAI as the centerpiece of the residency has been difficult. The sheer volume of PCAI standards is challenging, as previously noted, and residency administrators note that residents struggle to see the tangible value of the PCAI since it no longer counts toward course credit. To address this, the program plans to identify power standards from the PCAI, state competencies, and aligned performance assessments, and embed these into specific courses. While standardizing competencies and performance assessments across courses diminishes instructor autonomy in course design, Heritage leadership notes that it is a necessary tradeoff to ensure rigor across courses. This shift also means that the PCAI will no longer operate only at the field site but will become a foundational tool to inform the overall design of coursework, assignments and performance assessments.

Core teachers are paid less and receive less training. With grant funding, core teachers were paid a stipend, which served as recognition of their tremendous efforts and was also connected to professional expectations, such as attending regular training sessions. The end of the grant period necessitated a significant decrease in the stipend amount, and with that, a shift in the mandate that core teachers participate in professional training and development. As a result, fewer core teachers attend trainings, which are all now conducted in-house by HU faculty rather than by the broad range of experts from across Washington State that the original residency program utilized.

The site advocate role has evolved. The site advocate role has evolved over the years. When the program began, it was entirely

want to leave the district. Now that the university funds the program, there are still a small number of individuals working full-time as site advocates, but Heritage faculty also take on site advocate responsibilities in addition to their teaching responsibilities. While all course instructors may not have primary site advocate duties, all are assigned to at least one school where they work with TLTs. This allows course instructors to work directly with residents, meet with TLTs, and collaborate to understand how their coursework is animated in classroom practice.

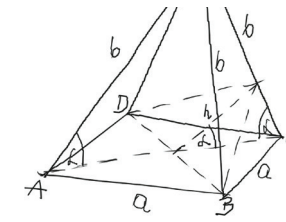
PART III

Refining the Plan and Looking to the Future

As residency programs have evolved over time, the importance of early, long-term sustainability planning has become increasingly apparent — particularly for residency programs that launch with large federal or private grants which call for broad-scale change within finite funding structures. A key lesson from the Heritage University experience is that when school systems and higher education institutions join together to launch a residency, they must articulate shared program impact and sustainability goals from the start — as well as a vision for how each partner will reallocate resources to advance these goals over time. An initial focus on sustainability is more likely to ensure that the program integrates into the fabric of each partner organization and remains coherent for the long term.

This case study closes with a note of deep gratitude and respect for the Heritage University leadership, site advocates, and other faculty members who have worked to maintain the residency program's innovative design elements in the face of seemingly insurmountable challenges. In a year of tough transition, various stakeholders have worked together in a relatively short period of time to ensure that the program's goals are still achievable and that the program remains an exemplary preparation pathway for the Yakima Valley teacher pipeline.

Building Novice STEM Teacher Capacity through Innovative Pedagogies and Coursework



How did that lesson feel?” asks Robyn, a math coach at Bronx Latin High School in New York City, after a recent lesson observation. + “It was my second time teaching it, though that first lesson this morning feels like it was a lifetime ago. I changed the warm-up to try to make it more accessible to students. I also wanted it to take less time,” says Christy, who had just taught the lesson to her 9th grade math class. + “It sounds like those changes helped,” Robyn observes. + “I thought the warm-up started off more smoothly than normal after lunch, then I transitioned to the mini-lesson. I wish I was a little less disjointed in explaining the function,” says Christy.

As Christy and Robyn continue exploring these and other instructional choices and questions on a crisp November morning in New York City, it is clear that Christy is expected to — and can — back up her responses with concrete evidence about her teaching as she meets with her coach. Formative assessment data, specific anecdotes, and even verbatim student dialogue all ground the discussion between Christy and Robyn. The level of detail in the conversation is impressive and, importantly, Christy knows that the lesson has room for improvement.

After discussing the observed lesson, Robyn returns to Christy’s teaching log to remind herself of the actionable goals they’ve identified for improving Christy’s teaching. This week she’s been focusing on management and transitions, including how to distribute materials and get students to begin working when they enter the classroom after lunch. While this growth focus is seemingly small, the conversation between Christy and her coach makes it clear that it is all in the service of being an effective teacher of mathematics.

The above exchange could easily have occurred between an experienced teacher and her coach. Christy, however, is a 9th grade math resident in the New Visions for Public Schools–Hunter College Math and Science Teacher Residency (MASTER); she had started her pre-service journey just a few months earlier. MASTER is a residency program focused on preparing secondary

math and science teachers to work in New York City public schools. It is built on the premise that the most powerful way to get new teachers to understand ambitious instruction in mathematics and science is to ground their learning experience in an ambitious instructional model. At every turn, MASTER’s novice teachers in training are challenged to understand and implement a type of math and science teaching that is rare in U.S. classrooms.

The MASTER program is a partnership among the New York-based nonprofit New Visions for Public Schools (New Visions), City University of New York – Hunter College (Hunter), the New York Hall of Science (NYSCI), and the New York City Department of Education (NYCDOE). Teacher candidates complete their yearlong residency teaching in a New York City public school classroom while also taking courses at Hunter. Residents then complete their coursework during their second year, which results in a master’s degree. The MASTER program is data-driven, intentionally designed, and constantly innovating in response to district, resident, and program needs. Over the past decade, MASTER has evolved into a strong pipeline for math and science teachers in NYC public schools. Gaining admission to MASTER is extremely competitive, with 250 to 500 applicants annually competing for 15 to 20 slots.

Since 2009, New Visions and Hunter have been working collaboratively to prepare new teachers to teach in New York City

MASTER in 2014 as a sister residency program to the existing New Visions for Public School–Hunter College Urban Teacher Residency. MASTER is a direct response to an increasing need to develop math and science teachers who have the pedagogical content knowledge and skill to teach their subjects in a manner aligned to both the Common Core and Next Generation Science standards.² The program’s model of resident learning is premised on the following three ideas:

- Teaching math and science requires specialized knowledge, and teacher preparation should focus on this knowledge.
- Individuals learning to teach need to receive data-based feedback and guidance on enacting skillful clinical practice in coursework and in the field — from instructors, mentor teachers, content-focused coaches, and peers.
- Learning to teach through MASTER should be consistent with the experience of teaching in New York City public schools.

These key ideas act as pillars that support every aspect of MASTER. The purpose of this case study is to shed light on how these pillars enact in practice to develop capacity for STEM teaching in New York City. This report details four instructional and pedagogical innovations central to MASTER’s program design, including:

- Using student thinking as a basis for developing novice teachers’ stance toward teaching
- Integrating specialized and pedagogical content knowledge into all elements of the program, including mentoring, coursework, and lesson planning
- Practice-focused coursework
- Coherence with the district’s teaching and learning priorities

What is evident throughout this case study is that the MASTER program takes a multi-faceted approach to support residents in their journey toward becoming excellent math and science teachers. What is impressive is how these layers work together

Using Student Thinking to Develop Novice Teachers’ Stance Toward Teaching

A key aspect of MASTER’s programming is the idea that student thinking is central to the work of teaching. Orienting novice teachers to the work of understanding student thinking begins by focusing coursework and other learning experiences on identifying and interpreting student errors and misconceptions. To better understand why and how the MASTER team does this programmatically, let’s return to Christy and learn more about her experiences as she prepares to become a high school math teacher.

We meet Christy at Bronx Latin School, where she is a resident in a ninth-grade math class. Though it is just November, in talking with Christy it is clear that she is starting to feel comfortable teaching high school math. She attributes her comfort to her summer and fall course experiences, the repeated opportunities she has to enact a lesson that she has already seen her mentor teach, the support of her math coach, and the numerous curriculum supports provided through MASTER.

During the first summer of the MASTER program, all residents work in a peer-enabled, restructured classroom (PERC: <http://percprogram.org>), where high school students work as teaching assistant scholars. Christy’s charge during the summer was to work with a struggling student one-on-one. She explains that this helped her learn a lot about how students think about math, and provided her with an opportunity to focus on one student’s mathematical misconceptions and the ways in which she could work to support him in learning to do increasingly complex math.³

Christy’s coursework throughout the summer and fall continued to provide her with repeated opportunities to think about student errors and misconceptions. One of the first courses residents take in the MASTER program does not occur in a classroom — instead, it happens in a museum. During their first summer, MASTER students take a course at NYSCI. The course in the museum begins with a task designed to model the type of learning experience residents would be expected to enact with their

smallest possible mirror I could buy that would allow me to see myself from head to toe? Residents started off thinking about it theoretically, then pulled out mirrors and even went into the museum to an exhibit that included a large plate-glass mirror.

The result of the experience is that residents — many of whom were science majors — were put into a place of not knowing. They had to put aside their science pedigree and background to wrestle with ideas. As competing ideas — many of which were inconsistent with one another — were put on the table, residents learned that there was nothing wrong with what they were thinking. This activity led to deep discussions about what it means to know, how to elicit student thinking, possible misconceptions (e.g., that mirrors are more like windows, so you would need a mirror the size of the thing you were trying to view) and how to use that knowledge in the design of learning experiences. (In case you are curious, it turns out that a mirror only half the size of what you are trying to see is needed, provided certain conditions of positioning are met.)

Following the mirror experience, residents work in design teams to plan a similar type of activity, which they then try out on the museum floor with students who are attending summer camp at the museum. Students are at summer camp voluntarily — for fun — and have a wide range of science knowledge. Residents are challenged to design an activity that is both engaging and accessible to all students. For this activity, teams enact a learning cycle that involves planning and teaching the activity, collecting video and other data about their teaching enactment,⁴ and meeting to review data sources in order to decide how the activity needs to be redesigned.⁵

In Christy's experience, the science instructor tasked students to think with both a "*teacher hat*" and a "*student hat*." Christy admitted that at first she thought this was a bit silly. But it was in that summer class that she learned that teaching is specialized and, while she had extensive classroom experience as a student, she had much to learn as a teacher. She learned to differentiate thinking like a teacher from thinking like a student and used error-analysis assignments to reflect on the value of student

The museum exercise pushes residents to think like a teacher and a student, and it also changes how residents think about instructional activities. Because a museum space is intended for visitors of all ages and skill, and because visitors are often there to have an enjoyable experience, residents begin to think differently about the sorts of experiences they could design to meet their learning goal. The science educator observed that in the enactments of practice occurring in her course at NYSCI, there is very little lecturing and a lot of focus on making sure the activity has an access point for all students. Numerous attempts to make the activity personally meaningful to the participant are also evident. In this way, the museum course also capitalizes on the unique expertise of museum education — creating accessible and engaging learning experiences.

This approach teaches residents about science content, lesson design, and enactment, and it also begins to develop their capacities as reflective practitioners. Residents watch videos of themselves enacting their lessons, review data from their enactments, and use this information to ground their discussion of what needs to change in the lesson. Tweaks to the activity design cannot be made unless there is a compelling, data-driven reason to make the change.

Finally, MASTER residents' lesson planning routines also emphasize a focus on student thinking and misconceptions. One mentor teacher explains that residents use a common lesson-planning template that has as its largest section the "*check for understanding*" component. Residents are also expected to write down what they perceive to be common misconceptions about the lesson topic. For example, if they are doing a quick check that uses multiple-choice questions, residents are expected to write down misconceptions for each answer choice. Residents also engage in error analysis routinely when examining their warm-up or exit tickets as part of their planning for future lessons. Mentors believe that this helps residents make data-driven decisions about misconceptions and how they should be addressed in their teaching practice.

A foundational belief of the MASTER program is that no one is born knowing how to teach math or science to high school students. Hence, the program focuses on teaching residents the specialized knowledge and specific pedagogies required to be excellent teachers of math and science.

As Christy teaches integrated algebra, she constantly builds off of the ambitious teaching models she observes her mentor teacher using each day. There's a cadence to Christy's learning that follows a predictable cycle — observe and then apply. Christy's mentor teacher, Sandra, is a graduate of the New Visions–Hunter Urban Teacher Residency program and teaches math in a manner that is well-aligned with MASTER'S vision for ambitious teaching. Each day Christy teaches the 9b class, which comes after 9a, except one day each week. Everything that Sandra teaches in 9a provides Christy with a model to work from as she enacts the same lesson for 9b. Each Wednesday Christy gets to teach first, which offers her the opportunity to think through the lesson differently. The modeling that this structure provides has helped Christy feel confident in teaching math very early on in her residency experience.

Let's return to the ninth-grade algebra lesson we observed Christy teach, focused on functions. A warm-up activity goes well. A majority of students are successful in identifying the correct values to complete a data table where the rate of change is doubling. The heart of the lesson — learning $F_{(n)}$ — goes all right. But some students are confused about why this mathematical idea is important, and the purpose of the lesson isn't entirely clear. After the warm-up, the lesson proceeds, with Christy offering a brief explanation of the mathematical concept. Students then work in small groups while Christy and her mentor teacher circulate to talk with students and collect formative assessment data on student performance. Toward the end of the period, Sandra takes over the class and Christy meets with her math coach for what they call a “*sacred meeting*.”

As Christy and her coach, Robyn, discuss the lesson, it is clear that pedagogical and content knowledge play a large role in the discussion. Christy and Robyn use the formative assessment data collected during the lesson to determine that only half the class demonstrated an understanding of the concept. Together

matter as part of the ninth-grade curriculum.

The nature of the conversation between Christy and Robyn is keenly focused on student learning and the specialized work of teaching mathematics. Over the course of the conversation they explore how to explain mathematical concepts, student responses to Christy's questions and how she could have pushed students to think differently through follow up questions, and students' mathematical interactions with each other. Even the discussion of the transitions in Christy's teaching is about math — how one moves from one mathematical concept to another and how a transition can be used as an opportunity to link concepts. The level of detail in the conversation is reflective of the idea that pedagogical moves — even small ones such as passing out materials — should be learned, and can be linked to content.

Across Christy's experience, it is clear that there are two intentional structures that work to support her and other MASTER residents to learn the specialized knowledge and pedagogical skill required to be excellent STEM teachers: mission-aligned mentor teachers and content-focused coaches. Each of these structures is discussed in detail below.

MASTER's Mentor Teachers

Almost all pre-service teacher development involves a mentor or cooperating teacher in some way, for varying lengths of time and for different purposes. While MASTER is no different, the program team takes a stance on the type of instruction they consider high-quality, and mentor teachers go through a rigorous selection process designed to reveal how well they align with this vision. Many of the mentors paired with MASTER residents went through the program themselves, and their teaching embodies the instructional focus endorsed by the MASTER program.

While there are handbooks and materials to support mentor teachers in their work, the vast majority of MASTER's mentor training is focused on discussion of student work and learning trajectories for beginning teachers. Mentor teachers receive their own coaching and support through multiple full-day professional development sessions that begin in the spring and continue throughout the summer, and then quarterly throughout the year.

pedagogies of teaching math and science.

Finally, an important way in which MASTER residents and mentors carve out space to discuss specialized and pedagogical knowledge central to their work is in their own weekly sacred meetings. Schools are busy places, and mentor teachers and residents found that without protecting time each week to talk, they might only talk in passing. Thus the construct of the sacred meeting was established. Each week, the sacred meeting — a protected period of time — is an opportunity for residents to meet with their mentor, their coach, or both. These meetings are remarkably content-focused. In observing one conversation between a resident and his mentor teacher, the discussion covered the following topics:

- One student's mathematical understanding
- The resident's interpretation of specific student talk
- Representing a mathematical idea on the board
- Foundational mathematical skills (and student performance data for these skills)
- The seating chart for one class and how students could be arranged to maximize a teacher's ability to support a struggling student
- The timing of circulating throughout the room while students are working and how/when to meet with specific students as a way to manage behavior and monitor learning.

The conversation was incredibly specific, grounded in data, and almost entirely focused on students' learning of specific content.

Sacred meetings between residents, their mentors and their coaches also take a continuous learning stance. For example, when Christy and her mentor Sandra first began working together, Sandra used a low-inference transcript (LIT) to literally write down everything that went on while Christy taught. When the pair noticed they were not using this tool in their debrief and follow-up conversations, they decided that Sandra would tailor her focus. She now takes an LIT of the specific aspects of the lesson related to the actionable improvement goal they identify each week, and the two use the LIT as a data point in their weekly sacred meetings to strengthen Christy's practice.

teachers. Science coaches are identified through the partnership with NYSCI, and math coaches are identified through a federal Investing in Innovation (i3) grant focused on standards-aligned mathematics teaching.⁶ In meetings with residents, coaches use a cognitive coaching model and often begin resident meetings with basic questions that lead to in-depth, data-driven discussions about pedagogy and student learning.

An important role of the coach is to collaborate with mentor/resident pairs to identify actionable goals for residents. To identify goals, coaches use a coaching progression that has been established over the years by MASTER leadership. For example, a noticeable trend is that in September residents need support identifying concrete, specific, and measurable objectives, as well as pacing lessons, transitioning between activities, and learning classroom systems and structures. Coaches are encouraged to focus on these aspects of teaching as part of the trajectory of development for novice teachers during September.

Math and science coaches participate in monthly coach meetings. In these meetings, coaches explore case studies and use data to discuss the progress of the cohort of residents. Meetings typically end by identifying actionable goals for their work with residents. Most often these goals focus on the pedagogical or specialized content knowledge residents need to continue to grow and develop as teachers of math and science. Residents must demonstrate growth over the course of the year, and coaches are held accountable to supporting this growth. If a resident's practice doesn't improve, coaches work together to determine the targeted learning and growth supports needed to strengthen his or her instruction.

Practice-Focused Coursework

We see Christy again at the end of the day at Hunter, where she is a student in a math course focused on mathematical misconceptions. Together with her classmates, she is looking at student work, hypothesizing about the nature of students' errors, and crafting a course of action to support student learning.

example, when MASTER began, residents might have taken biology courses designed for individuals training to receive a Ph.D. in biology. These courses weren't preparing candidates for teaching high school math and science. Now courses are specifically designed for teacher residents with a focus on their particular instructional and pedagogical needs, which differ from those of someone studying to be a bench scientist or applied mathematician. One such example of a redesigned course is a course focused on mathematical misconceptions.

In talking with course instructors and residents, it is clear that there are numerous advantages to practice-focused coursework. First, students develop a mindset that the work of teaching can be learned and practiced. For example, in the math misconceptions course titled *Challenging Concepts in Math: Using Research to Identify Common Misconceptions and Assess Student Learning*, residents learn that the errors students are making are grounded in something rational and that the work of teaching is to anticipate and understand students' misconceptions. Residents explained that they approach mathematical misconceptions differently as a result of taking the misconceptions course — first, they approach the misconception from the viewpoint that a wrong answer is right to the student; this shifts the work of teaching to try to understand students' thinking. The math misconceptions course instructor believes that after residents take the course, it is as though they have five years of experience under their belt because they know what to look for and are open to hearing their students a little better — moving from just correcting errors to instead being oriented in how to explore errors as part of the work of teaching mathematics.

Hunter and MASTER have collaborated to provide coherence between the reality of classroom practice and course content. For example, the assessment course has changed dramatically over the years, due to a variety of influences. While the course historically focused on general issues in assessment such as validity and reliability as well as large-scale high stakes assessments such as the New York State Regents exam, Hunter kept receiving feedback that students wanted to learn how to collect and make use of formative assessment data in their classrooms. Now the assessment course is almost entirely focused on the genre of classroom-based

education world, the course is now focused on the pedagogical content knowledge central to the teaching of biology and was collaboratively designed by a bench scientist and science educator.

Coherence with the District's Teaching and Learning Priorities

MASTER residents teach in NYC public school classrooms every day for an entire year. They not only learn to teach content using the tools and resources they will use in their first year of teaching, but have daily opportunities to observe an expert teacher implementing lessons using curricular materials aligned to the Common Core math and NY State science standards, and to co-plan and discuss lesson enactments with their mentor and coach. This means that after Christy learns a concept in one of her courses, she has the opportunity to observe how her mentor applies that concept in the context of the district curricular priorities, unpack her observations with her mentor and coach, apply the concept in her own lessons and instruction, and receive immediate feedback in order to revise and strengthen her practice. This helps to ensure a high degree of coherence between how Christy learns to teach and the teaching and learning priorities of the district.

The landscape of science and mathematics teaching has changed considerably over the past decade. Residents are supported in this change by having access to New York Hall of Science Museum resources and the New Visions a2i project (<http://math.newvisions.org>), which provides them with access to research-based assessments and carefully designed and learner-responsive formative assessment lessons in Algebra I, Geometry, and Algebra II.

To establish even greater coherence between district priorities and resident training, MASTER aligns its suite of resident performance assessments with New York City's teacher assessment tools. Residents are formatively assessed during their residency year using the district tool, which is aligned with eight high-leverage competencies from Charlotte Danielson's Framework for Teaching identified by NYCDOE. MASTER's evaluation tool MASTER's evaluation tools integrate the NYC DOE frameworks, as well as the CCSS and Next Generation science

Conclusion

Preparing teachers for ambitious teaching in an age of accountability is complex, difficult work. When designing a residency program with multiple moving parts and partners, it can be challenging to create a coherent experience for residents and sustainable work for all involved. Although the MASTER program provides strong evidence that this is possible, challenges have manifested across three domains – teacher educator capacity, staffing across diverse math and science content areas, and negotiating the university structure.

Teacher educator capacity is a challenge MASTER faces annually. While NYSCI and New Visions residency staff collaborate with Hunter faculty to design new and innovative courses whenever possible, the coursework is ultimately tied to specific teacher educators. Although course outlines and materials exist and can be shared, when the person responsible for collaborating to design and implement the course isn't the person teaching it, it is difficult to translate all of the knowledge that is embedded into the course materials into a course experience aligned to MASTER's vision. Hunter College has addressed this challenge by building a small group of adjunct instructors who are committed to the residency work. The challenges of transient adjunct labor, however, raise another set of concerns.⁷

Staffing expert coaches across all math and science specialty areas is difficult. Secondary science and mathematics have many subspecialty areas, including biology, chemistry, earth science, physics, algebra, geometry, trigonometry, and calculus. A science coach with deep background knowledge of physics can observe a physics lesson differently than an earth science or biology lesson and is likely to be less comfortable coaching the specialized and pedagogical content knowledge for residents teaching outside of her core expertise. In an ideal world, content experts with deep knowledge of the specific math or science area residents teach

with different areas of science expertise.

Negotiating the university structure can feel slow. Hunter College leadership noted that innovating within a university setting is sometimes challenging, because university policies can impede innovation. Hunter has changed several courses as part of their collaboration with MASTER, in some cases multiple times. However, they have made these changes without having to officially modify the course catalog each time. Instead they've taken advantage of existing practices in place that allow for an experimental course to be piloted several times before undertaking full-blown curriculum changes. Hunter has also rearranged the order in which courses are taken, which can be a powerful way to shift the focus or better meet the needs of residents without curriculum changes.

Finally, Hunter leadership has had to challenge the norms of autonomy within the university. Course instructors often design and teach their course without attention to any other courses. However, Hunter leadership recognizes that collaboration across course faculty has changed the nature of residents' experience. Simple things such as managing the workload by distributing assignment due dates or creating assignments that span more than one course increase resident satisfaction considerably.

Despite these challenges, MASTER has demonstrated nimbleness and innovation to meet its goal of creating a robust pipeline of STEM teachers for New York City. Through reimagining coursework so that it is practice-based, considering alternative pedagogies such as coursework hosted in museums, hiring content area coaches in addition to mentors, and looking closely at how the program can align with the district's needs, MASTER has become a unique and model pathway into science and math teaching. These efforts require hard work and involve coordination among multiple stakeholders across several organizations. The result, however, is residents who become confident and capable beginning STEM teachers.

Developing an Authentic Partnership to Transform District Human Capital Pipeline



A *tidal wave of change is happening in Fresno Unified Schools,*” explains a career educator from the central-California district, the fourth largest in the state. She attributes this change to the Fresno Teacher Residency program (FTR), a partnership between California State University-Fresno (Fresno State) and Fresno Unified School District (FUSD) that emerged from a mutual desire to place an excellent teacher in every FUSD classroom, every day.

An unwavering commitment to serve the students and families of FUSD lies at the core of the FTR partnership. Faculty who work at Fresno State are keenly aware that their work is in partnership with FUSD and in service to FUSD students. In fact, Fresno State’s dean makes it clear in faculty meetings, in hiring, and in collaborative activities that faculty work for the students and families of FUSD, not the college students at Fresno State. This statement is not meant to be hyperbolic — of course faculty are committed to serving their teacher candidates — but undergirding this service is a steadfast commitment to ensuring that FUSD students experience excellent teachers.

Following a brief program overview and a look at the origins of the FTR, this case study examines the structures, systems, and stances that enable this remarkable alliance to serve the Fresno community, listed here and examined in depth below:

- True collaboration between stakeholders across both organizations
- A cohesive approach to teacher development
- Partner responsiveness to one another’s needs

The FTR Program

The mission of the Fresno Teacher Residency program is to develop a strong pipeline of student-ready STEM teachers for FUSD. FTR residents experience an intense, compressed (18-month) opportunity to earn a Multiple Subject credential, Foundational

STEM in grades 4-8 initiated from state level efforts to develop a middle grades teaching certification. While this certification never came to fruition, stakeholders across Fresno State and FUSD recognized that such a focus was central to improving student outcomes in math and science. The FTR’s 4-8 STEM focus spans grade levels that are not typically served by the same certification and thus forges collaborations and conversations across upper elementary and middle schools that might not otherwise occur. Additionally, the STEM focus serves as a vehicle for changing the way students learn in the district, especially in math and science.

All courses are taken as a cohort and residents are placed in purposefully chosen partner school sites in clusters of three or more. They gain teaching experience in both elementary and middle school — completing as many as four placements across the duration of the program. They receive support from both FUSD and Fresno State faculty who co-teach multiple courses and collaborate to identify data-based needs and make changes to the program and coursework — sometimes within days of observing residents’ teaching.

“It was very apparent to me, while I was learning to teach, that I was learning to teach in a partnership,” notes one program graduate. *“In every class there was a Fresno Unified and Fresno State person co-teaching together. This was great, because we were co-teaching (with our mentor teachers) while they were also learning to co-teach.”* Stakeholders from across the FTR program shared similar sentiments, making it clear that the partnership is in no way a collab-

While the FTR is in many ways the most comprehensive partnership between Fresno State and a partner district, the university has established professional development schools and other strong, long-standing partnerships with districts throughout California's Central Valley, including Sanger, Clovis, Central, Madera, and Porterville.

These alliances work to impact the human capital pipeline into their affiliate school systems by preparing teachers specifically to work in their schools and districts. For example, in Sanger, candidates participate in professional learning communities (PLCs) alongside their mentor teachers from day one. Whereas candidates are expected to substitute teach while their teachers attend professional development in many teacher preparation programs, Sanger candidates are not put into this role. The districts' perspective is that PLC time is important professional development around student learning during which teachers, candidates, and other stakeholders work collaboratively to explore the following four questions.

- What do we want students to know?
- How do we know that they know it?
- How do we respond when learning doesn't take place?
- How do we enrich the experience for students who have

already met standards and need additional instructional experiences?

Thus, teacher preparation candidates who complete their clinical experience in Sanger and are hired to teach there when they graduate from Fresno State have the luxury of beginning their first year as a teacher of record knowing all the norms of the district and having a full year of experience working in Sanger classrooms. Sanger school leaders are committed to the Fresno State candidates training in their district. One leader notes, *"Currently, there are 14 candidates in this cohort, and there will be more than 14 positions that we will be hiring for next year. We are investing in them knowing they are going to be a Sanger Unified teacher in August, with kids, in our classrooms. It's our duty to begin preparing residents to be the most effective teacher out of the gate on day one."*

Forging a Partnership

In 2009, FUSD's Human Resources (HR) department noticed that the district's teacher development efforts were very fragmented. From a recruitment perspective, HR had concerns about the human capital pipeline into FUSD, especially as California faced looming teacher shortages. From a structural perspective, the department felt that there was no one really responsible for ensuring a coherent approach to teacher development at the district. Hence, the FUSD Teacher Development Office was born.

With the creation of this office, the director of HR and her team began canvassing districts across the country with strategic pipeline initiatives. They aimed to become a national model for human resources and human capital. Their investigations revealed that many districts with similar goals to their own had residency programs, embedding pre-service teacher training in schools and with students. These innovative, district-serving preparation programs, it became clear, provided a steady pipeline of student-ready teachers and doubled as the initial component

The commitment to teacher learning at FUSD does not stop with the Teacher Development Office. The entire academic team — from the Chief Academic Officer to the Director of Curriculum and Instruction to the Director of HR — acknowledges that teacher preparation is a key aspect of their lattice of career opportunities for teachers. They recognize that if their primary responsibility is to provide an effective teacher in every classroom — no matter who is on leave, or who retires throughout the school year — then the FTR is an effective vehicle for achieving this goal. This depth of commitment to teacher preparation by district-level leaders is unusual. Let's now turn to explore how this commitment informs the structures, systems, and stances that enable the FTR partnership.

True Collaboration between Stakeholders Across Both Organizations

The partnership between FUSD and Fresno State is multi-dimensional and high functioning. A major reason for this is because

dent and dean — view high quality teacher preparation as a key strategy in their mission to provide FUSD students with excellent teachers.

Collaborative Walks

FUSD and Fresno State faculty and school leaders walk classrooms together every month. They observe instruction and discuss what they see to better understand the learning opportunities FUSD students experience and the challenges teachers and students negotiate daily. Information gleaned from these walks informs the ongoing design of coursework and mentorship that residents receive. In teacher preparation writ large, and even in most residency programs, it is not common practice for district and university personnel to make joint, data driven decisions about how to shape novice teacher learning in real time.

The monthly walks also provide Fresno State faculty with exposure to district policymakers as they interact with associate superintendents and district curriculum specialists. Their interactions strengthen the partnership and the quality of instruction that happens both in FUSD classrooms and in Fresno State's residency coursework — and ultimately, strengthen FTR resident readiness for success in the FUSD context. One current resident notes, *“The professors are able to focus individually on each of us. They teach us how to do something — like shared reading. We don't teach that type of lesson until we have a good sense of how to do that type of teaching. We are learning what we need to learn in the curriculum at the time that we need to learn it.”*

Co-Taught Courses

Fresno State and FUSD work collaboratively to co-teach FTR courses, which many stakeholders view as the program's biggest strength. Every course is co-taught by a university faculty member and a FUSD teacher, which allows the university to accomplish its goals while ensuring that the district philosophy and approach is front and center in each course. The model is intense. It requires significant time and commitment; coordination is often difficult. But when it works well, the faculty member and teacher plan every class together and do a lot of co-teaching. It

the impact of their expertise in classrooms. One faculty member notes, *“After doing this for three years, I'm starting to see my own impact on content and pedagogy in the district.”* Co-teaching helped make that happen.

When the program began, some Fresno State faculty members expected that their course goals, objectives, and methods would clash with those of FUSD staff. They found, however, that co-teaching provides a structured opportunity to revisit instructional norms and engage in conversations focused on making content relevant for residents and impactful on student learning.

Shared Resident Selection and Graduate Hiring

Another way that FUSD and Fresno State work collaboratively is by sharing recruitment and development staff, who see candidates from initial recruitment to FTR through to hiring and beyond. When candidates apply to FTR, they apply to Fresno State as well as to FUSD through the Office of Human Resources. FUSD assists to ensure that all state-level requirements are fulfilled, and works closely with Fresno State's liaison to crosscheck references and GPAs. When initial requirements are met, candidates complete a 3.5-hour interview process asking them to work collaboratively to respond to an instructional challenge, share their presentation skills, answer a variety of questions, and provide a writing sample. The process is conducted by FTR leadership and includes faculty and staff from both FUSD and Fresno State.

FUSD also works collaboratively with Fresno State to create a hiring process that gives priority to FTR residents. Various stakeholders from both organizations observe residents in pairs or triads, and, using a common rubric, evaluate the potential of residents to receive early hiring offers in December. This all-hands-on-deck approach benefits everyone. It allows FTR to observe firsthand their successes and gaps in preparing teachers to teach in FUSD. It also provides occasion for stakeholders across both organizations to consider an individual's transition from resident to teacher of record.

To date, this approach has shown favorable outcomes. Whereas other districts throughout California have negotiated teaching shortages, FUSD has had a 99% fill rate in some of the past years;

partnership, they've met curriculum specialists, they know who to go to, who to call to get answers, as soon as they start.”

These efforts make it clear that while true and deep collaboration is not always the easiest or most efficient pathway, it produces results that each organization could not realize alone.

A Cohesive Approach to Teacher Development

Before the FUSD Office of Teacher Development was established — and prior, even pre-dating the launch of FTR — various programs to improve teaching quality were run by different people; no one marshaled them in a deliberate strategy to strengthen overall teacher effectiveness in the district. This has changed dramatically over the past decade. Collectively, FUSD and Fresno State commit to the idea that individuals enter the profession of teaching as beginners and engage in ongoing professional learning over time to strengthen their craft, knowledge, skills and effectiveness in the FUSD context.

Preparation for the Fresno Context

An early step taken to increase coherence in FTR resident development was to align the FUSD's high priority competencies for teaching and learning with the competencies taught at the university. Prior to the launch of FTR, first year teachers out of Fresno State were often put in the position of making meaning from this misalignment. The partners worked to integrate the FUSD competencies throughout FTR coursework. This mutual commitment to preparing residents specifically for the FUSD context, both instructionally and operationally, is a key asset of the partnership.

As they complete their various placements, residents come to know FUSD's systems and norms. One graduate explains, *“There are multiple reasons why I felt more prepared for teaching having gone through the FTR. Because we learned on the ground in Fresno classrooms and schools, we know the systems and structures — even the acronyms. A lot of the first year teachers I work with have no idea how to use [FUSD] programs for their benefit. When I started teaching, it didn't feel like I had a brand new job where I had no idea what to do.”*

4–8 STEM teaching even after the state abandoned plans to develop a 4–8 teaching certification. As a result, residents complete placements in both upper elementary and middle school classrooms. One resident reported that upon starting her second placement in a 4th grade classroom after completing her first in a 6th grade classroom, she was able to see the deep connections between learning fractions in grade 4 and understanding ratio in grade 6. Having the opportunity to work across traditionally separated spaces (elementary and middle school) allows residents to understand learning trajectories that are typically not observed by candidates — and teachers — who work in either elementary or middle school, but not both. Thus, the focus on grades 4–8 effectively prepares residents for placement at multiple grade levels and provides opportunities to understand firsthand the trajectory of development of key mathematics standards over time.

Learning Happens in Cohorts

As stated earlier, residents are typically placed with one or more of their peers in the same school. This allows them to rely upon and support one another, while providing additional assistance to the FUSD schools that need them. And the FTR cohort placements do not stop with the residency year. This is a key component of program's strategy to maintain coherence as residents evolve as FUSD teachers. The district leverages the cohort placement model during resident hiring to provide additional support to first year teachers. For example, in one turnaround middle school, the entire 7th grade science team was strategically hired as a cohort of three FTR graduates. The principal used this as one strategy for turning around his school, specifically the nature and quality of science instruction.

Professional Development As a Stance

While some districts view teacher professional development as an activity, FUSD and Fresno State treat it as a stance; professionals in FUSD and Fresno State are always learning. The FTR allows both partners to manifest this stance in practice. The FTR ecosystem strengthens instructional capacity and student learning across the district by uniting Fresno State methods professors with FUSD leaders and coaches as co-teachers. Residents are

one example of how FTR serves as a vehicle for instructional change in the district. Residents' eagerness to implement inquiry-based mathematics teaching makes its way into FUSD classrooms. In fact, mentor teachers' anecdotal reports of their classroom level data suggest that residents have taught mentor teachers a tremendous amount about Common Core aligned mathematics teaching — perhaps a greater amount than in more formal district professional development on the topic.

A commitment to residents' professional learning does not end with graduation day. FTR graduates have an ongoing relationship with the university beyond their residency year. They are supported with monthly professional learning sessions and ongoing support. Fresno State staff regularly visit graduate classrooms; informally, if someone is doing something exciting, Fresno faculty spreads the word and suddenly the classroom is packed with visitors.

Partner Responsiveness to One Another's Needs

According to the Dean of Fresno State's Kremen School of Education, the ultimate clients of the college — and by default, all faculty members who work with the FTR program — are the students, families, and communities of FUSD. But in their partnership work, FUSD and Fresno State are responsive to one another's needs, working to understand what each organization hopes to accomplish through the residency and other partnerships, as well as how they might help each other achieve respective and shared goals. One FUSD leader explains it in this way: *"The trust and depth of understanding of one another's work is important. I now really understand what the university does through their system. They really understand all the things we have to do through our system. By really understanding that — hearing that — and not ever using it as a reason not to drive to what we all know is the vision that we set together — I think that's a big deal. The skill, trust, and depth of understanding is helping us move to this great place."*

residents, starting the calendar two weeks prior to the start of the traditional semester so that residents have time to plan with the entire team they will be working with throughout the school year. This positions residents as co-teachers in front of their students and as school-wide colleagues on day one. The payoff for this has been principal buy-in and loyalty, and eagerness to continue hosting residents and hiring FTR graduates.

Conclusion

The partnership between FUSD and Fresno State has brought many positive outcomes for both organizations. The residency program has begun to change the landscape of pedagogy in FUSD schools, and bi-monthly partnership meetings result in dialogue between district leadership and faculty members that extends beyond bettering the opportunities for pre-service teachers. The work between these two organizations demonstrates that a true partnership is not just about teaching courses in a classroom or off-campus in locations throughout the district. One faculty member explains, *"Just teaching a class out at a school site doesn't make it a partnership. We want to be out in the schools on a regular basis for other things. We do embedded classroom professional development where we are in classrooms with teachers doing problem solving and making instructional decisions and interviewing kids. All of us make choices to do that as part of our work. It's so important if we want to make what we do in the program relevant, and help it to foster real change."*

Finally, the FUSD and Fresno State collaboration reveals that the partners do not fear failure. They prototype and take risks together; they try new things and work to unpack challenges, even when the work requires negotiating complex university or district systems. They accomplish this by keeping a constant focus on their shared vision of having an excellent teacher in every FUSD classroom. When the team gets caught up in all the reasons they might not be able to do something, they remind themselves to keep moving forward toward what they know is right and just for the students and families of Fresno.

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