STEM Learning Opportunities Providing Equity (SLOPE): Innovations that Complement the Implementation of High Standards

SLOPE Coaching Component Guide

Sharon Twitty, Project Director
ARCHES

Dr. Ivan Cheng, Associate Professor
California State University, Northridge

Table of Contents

Investing in Innovation Grant

The STEM Learning Opportunities *Providing Equity i3* project one of just 49 Investing in Innovation projects awarded nationwide by the U.S. Department of Education. The winners were selected from among nearly 1,700 applicants and represented a cross-section of school districts and nonprofit education organizations, including institutions of higher education.

The federal i3 grant program was established by the American Recovery and Reinvestment Act of 2009. The i3 competitive grant program provides funds to support local educational agencies (LEAs) and nonprofit organizations in partnership with LEAs to expand the implementation of, and investment in, innovative practices that are demonstrated to improve student achievement, narrow achievement gaps, decrease dropout rates, increase high school graduation rates, or increase college enrollment and completion rates. The federal program's goal is to identify and document best practices that can be shared and taken to scale based on demonstrated success.

Study Abstract

The purpose of this study is to increase the success of all students, especially under-represented high-needs students, in algebra and science, technology, engineering, and mathematics (STEM) high school pathways through rigorous and relevant project-based contextual lessons that accelerates the learning of fundamental math concepts. The intervention itself consists of three distinct parts: professional development for teachers; a summer session offered between grades 7 and 8 that is focused on Algebra readiness and college awareness; and a project-based Algebra I curriculum taught during grade 8. All teachers assigned to the treatment condition will be exposed to the professional development opportunities. All students assigned to the treatment teachers will be exposed to the Algebra I curriculum. Only students identified as having academic need will be recruited for the summer program. So, to accommodate this program, we plan to examine the impact of this intervention in "dosages" administered. That is, all students assigned to the treatment condition will be exposed to at least one dose of the intervention (project-based Algebra I curriculum in grade 8). A small subgroup of students will be exposed to an additional dose (summer session in addition to the PB Algebra curriculum). Potential benefits of this project include increased numbers of students who successfully complete Algebra 1 and that subsequently enroll in more advanced mathematics courses, pursue STEM career pathways beyond grade 8, and learn about postsecondary education opportunities. All data collected on subjects are routinely collected by districts/schools (e.g., assessment data, attendance, course enrollment) and the identity of subjects will be protected through confidential coding of personal information.

Project Purpose and Background

A major factor in our nation's international economic competitiveness is the strength of our future workforce in science, technology, engineering, and mathematics (STEM). How well we prepare K–12 students for these jobs—through curricula that communicate the excitement of STEM learning, implementation of high academic standards, effective teaching strategies that effectively reach diverse learners, and programs that help students understand how to succeed in high school and transition to college—will determine success or failure in meeting this workforce need.

Today, California is failing at this critical task. High schools are producing too few graduates with the mathematics skills and motivation to pursue STEM postsecondary education and careers. Three contributing factors stand out: poor mathematics performance—especially in California's standard of 8th grade Algebra I—which leads students to eschew or fail in higher-level mathematics courses; curricula that fail to engage students in mathematics; and inadequate knowledge of and preparation for the high school courses required for college entrance and postsecondary education success. This project tackles this problem by improving performance in 8th Grade algebra and building a college-going culture in schools that serve low-income and under-represented California high school students.

The data on students' lack of college academic readiness—especially in math—are sobering. In 2008, only 23% of California high school seniors completed the courses required for state university entrance (CPEC 2010). As many as 70% of entering community college students nationally must enroll in remedial mathematics courses, derailing college success for many students (Blum 2007).

This lack of college-readiness is even more severe among historically underrepresented students, who in 2007 made up 40% of California's K–12 population. Only 9% of African-American males and 10% of Latino males completed the courses required to enter one of California's state universities (CPEC 2010). Results from the California Standards Test (CST) for Grade 8 algebra show a 22 to 30-percentage point gap between white students and their Latino and African American peers (CPEC 2010). As a result, inadequate numbers of minority students are able to move beyond the basics of elementary algebra to complete the higher-level mathematics courses needed for college success (U.S. Department of Education 2007).

This project will provide high needs students an intensive approach that includes an accelerated algebra preparation through project-based, relevant pre-algebra and algebra and college knowledge in the summer and an enriched curriculum in the academic year. The project-based curriculum and college awareness curriculum will also include coaching to support their implementation as well as provide teachers with skills to accelerate learning for high-needs students.

This project draws on the research literature on summer learning (Cooper, et al. 2000), project-based learning (Wong, et al 2009), teacher professional development and coaching (Joyce and Showers, 2002), college preparation (McClafferty, et al. 2002; McDonough, 2005), and effective strategies for English Learners (Advani, et al. 2008; Dutro & Moran, 2003).

The research suggests that summer programs can mitigate the loss of mathematics knowledge (Cooper, et al. 2000) that normally occurs over the summer particularly among low SES students (Jamal 1994) provided the curricula vary from the normal academic year (Karweit, 1985). Furthermore, project-based learning (PBL) promotes greater retention of knowledge (Wong, et al. 2009). This approach has shown to be more effective than traditional instruction in mathematics and science for both skill development and conceptual understanding (Boaler, 1997; Cognition and Technology Group at Vanderbilt 1992; Capon & Kuhn, 2004). Through PBL, lower-achieving students perform better, and all students improve in 21st century skills like problem solving (Mergendoller, et al. 2007; Gallagher, et al. 1992). The college knowledge portion of the model builds on the research on creating a college going culture (McClafferty, et al. 2002; McDonough, 2005). The necessary elements described—college talk with clear information and resources, counseling, testing and pre-college experiences, and family involvement as part of the college culture—all are included in our model. A study by Wimberly and Noeth (2005) reports that students receive help from parents (67%), teachers (42%), friends (35%), and counselors (25%), making a case for the component to teach college knowledge to families of students as well as teachers.

We also draw on the research literature on the role of coaching in changing teacher behavior. Joyce and Showers (1980) note that teachers implement new learning at a much higher rate when they received follow up coaching and support. In more recent research, Joyce and Showers (2002) noted that instructional coaching in collaborative teams of teachers can provide the support and professional development necessary to advance teaching skills. Edwards (1995) studied 153 teachers involved in a coaching model and found they had a deeper understanding of classroom practices. The coaching model we propose will provide an expert coach for teams of three or more project teachers who collaborate together at a site via the web.

The college awareness portion of our intervention builds on the research on creating a college going culture (McClafferty, et al. 2002; McDonough, 2005). Key elements described in the research include providing students with clear information, counseling, assessment testing, precollege experiences, and ensuring family involvement in learning about the college going process and expectations. Our college awareness component will help students develop knowledge of the different college systems, college preparation courses required in high school, the relationship between mastery of mathematics in high school and future acceptance to college and STEM careers, college and career pathway opportunities, opportunities for financing college, and the college application process. We will also provide support to students and families through workshops and college visits.

Promoting a college-going culture will be achieved though the development of a college awareness curriculum (CAC) to be implemented during the summer program as well as during the regular school year. The CAC is intended to bridge the gap between the Algebra I content students learn in class and the associated college preparation leading to STEM careers. Additionally, CAC's emphasis on applying algebra content to college readiness research that is linked to student career interests aligns well with student-centered teaching, advanced skill application and higher order thinking. Such items are promising when it comes to increasing the academic attainment of students who are academically under-performing or who are culturally marginalized (Conley, 2007; ACT, 2006; The College Board, 2000).

The CAC is built on the premise that although mathematics usually tends to be presented as a set of objective and universal facts and rules which are viewed as "culture free" and not considered a socially and culturally constructed discipline, teachers who provide culturally relevant instruction capitalize on student strengths—emphasizing what they do know instead of what they do not know. For example, the curriculum of the Algebra Project (Silva & Moses, 1990) uses student knowledge of the subway system as a basis for understanding operations with integers. The focus on student strengths contrasts to a remediation model of teaching urban and low income students, where curriculum and instruction are predicated on what students do not know by emphasizing rote skills (Haberman, 1991; Oakes, 1990).

The CAC relies on research that indicates that learning mathematics in context assists in providing student motivation and interest and enhances transference of skills by linking classroom mathematics with real-world mathematics. The CAC does not suggest learning algebraic ideas and procedures by inserting them into "real-world" textbook problems or by extending mathematics to larger real-world class projects. Rather the classroom itself becomes the context in which mathematics is learned and understood: "If the students' social and cultural values are encouraged and supported in the mathematics classroom, through the use of contexts or through an acknowledgement of personal routes and direction, then their learning will have more meaning" (Boaler, 2000).

Project Description

The SLOPE Project is a math intervention that is based on project-based instruction (applying math knowledge and skills to real-world contexts and projects). Its aim is to improve student achievement in math and develop a college-going attitude among middle school students.

Evaluation of the project will be conducted as a randomized controlled trial (RCT) where teachers who are teaching Algebra I are assigned to the treatment or control condition. Students will not be randomized; intact classrooms will be used. The second and third components -- a Summer College Awareness and Math

Proficiency (Summer C.A.M.P.) program supported by a well designed coaching component that will provide teachers with the skills to accelerate learning for high-needs students.

Project Elements

1. **Project-Based Mathematics Curriculum**
   - Pre-Algebra Summer Program (5 weeks)
   - Algebra I drop in units (4 units)
   - Extended Day Support (up to 60 minutes a week after school)
   - **Developer:** ConnectEd: The California Center for College and Career

2. **College Awareness Curriculum (CAC)**
   - CAC for Pre-Algebra delivered on Fridays during C.A.M.P.
   - CAC Algebra I curriculum—integrated explores the six STEM career clusters, and culturally relevant to underrepresented students.
   - **Developer:** R.T. Fisher Educational Enterprises, Inc.

3. **Online Coaching and Collaboration**
   - Responsive Teaching Cycle (RTC) Model—collaborative, reflective and focused on student work
   - Online Coaching - Up to 3 hours a week, utilizing ipad2 technology
   - Common Core State Standards Support
   - **Developer**: Dr. Ivan Cheng, California State University, Northridge

Project Evaluation & Analysis Design

Impact Research Question	Analysis Plan
1. On average, for student cohort 2, does performance on the state's annual standardized assessment in mathematics differ for students who participate in the project-based drop-in units and students who do not participate in the project-based drop-in units?	A 2-level HLM that examines the impact of project-based drop-in units on CST scores (based on approximately two-thirds of student sample who are only exposed to the project-based drop-in units)
Exploratory Research Question	**Analysis Plan**
1. On average, for student cohort 1, does performance on the state's annual standardized assessment in mathematics differ for students who participate in the project-based drop-in units and students who do not participate in the project-based drop-in units?	A 2-level HLM that examines the impact of project-based drop-in units on CST scores (based on approximately two-thirds of student sample who are only exposed to the project-based drop-in units)
2. On average, does the impact of intervention on the state's annual standardized assessment in mathematics differ by gender for students who participate in the project-based drop-in units and students who do not participate in the project-based drop-in units?	A 2-level HLM that examines the impact of project-based drop-in units on CST scores by gender (i.e., differential treatment impact by gender)

Project Partners

Developers:
　　California State University, Northridge
　　ConnectEd
　　R.T. Fisher Educational Enterprises, Inc.
　　WestEd

School Districts:

Antioch Unified School District	Los Angeles Unified District #2
Newman-Crow's Landing	Pasadena Unified School District
Patterson Joint Unified School District	Porterville Unified School District
Redding School District	Waterford School District
West Contra Costa Unified School District	

SCHOOLS

PILOT

Limited testing of study components

(RCT and Rollout schools not eligible for Pilot)

Oct 2010-Jun 2012

RANDOMIZED CONTROLLED TRIAL (RCT)

STUDENT COHORT 1

Summer Academy | Algebra I / Extended Day

STUDENT COHORT 2

Summer Academy | Algebra I / Extended Day

ROLLOUT

Summer Academy | Algebra I / Extended Day

Sep 2014-Sep 2015

Jun 2011-Jun 2012 | Jun-Aug 2012 | Sep 2012-Jun 2013 | Jun-Aug 2013 | Sep 2013-Jun 2014 | Jun-Aug 2014 | Sep 2014-Jun 2015

PROJECT TEAM

PROJECT PLANNING
- Initiate Project
- Revise Study Design
- Request Design Approval
- Plan RCT
- Request IRB Approval
- Recruit Teachers
- Review Pilot
- Set Up RCT

RCT IMPLEMENTATION, MONITORING, & DATA COLLECTION

RCT ANALYSIS & REPORTING

9

Overview

Project **Teachers Receive:**
- Personal mentoring – 1 to 3 hours of weekly, structured support with a highly qualified and trained coach
- Project-based, CST and Common Core (CC) aligned curriculum
- College awareness curriculum
- Instructional materials to implement curriculum
- Professional development opportunities in the following areas: project-based, stem-focused algebra curriculum; integrated, STEM-focused college awareness curriculum; *California Standards for the Teaching Profession* (CSTP); classroom organization and management; academic content standards and performance levels for students; using technology to support professional learning of teacher to improve student learning, equity, diversity, and access to curriculum, creating a supportive and healthy environment for student learning; teaching English learners; and teaching special populations
- Support in transition to mathematics CC implementation

SLOPE Coaches Receive:
- Training and support to implement RCT model and a professional coaching community
- On-going support from coaching team led by faculty from CSU Northridge
- Networking to enhance knowledge and skills, problem-solve, assess, and reflect on teaching and learning
- Standards-based and Common Core aligned project-based curriculum and instructional materials
- College awareness training and curriculum
- Compensation (if all requirements are met) of $4000 per year
- Ipad2

Districts Receive:
- Project teachers that are trained in ConnectEd curriculum units, college awareness curriculum and receive extensive coaching on effective strategies to support learning of all students
- Two years of funding to support an intensive summer College and Math Proficiency C.A.M.P.
- Opportunity to build capacity and support of 8th grade Algebra I teachers within the district
- Site administrator training in support of project based learning, college awareness and coaching
- Definitive research findings regarding SLOPE 3 tiered intervention

Support for the California Standards for the Teaching Profession

The CSTP are divided into six areas covering skills, knowledge and everyday practice that are essential to effective teaching:
1. Engaging All Students
2. Creating and Maintaining Effective Environments for Student Learning
3. Understanding and Organizing Subject Matter for Student Learning
4. Planning Instruction and Designed Learning Experiences for All Students
5. Assessing Students for Learning
6. Developing as a Professional

RTC model supports teacher development in all of the six standards.

STANDARD ONE:	STANDARD TWO:
ENGAGING AND SUPPORTING ALL STUDENTS IN LEARNING	CREATING AND MAINTAINING EFFECTIVE ENVIRONMENTS FOR STUDENT LEARNING
1.1 Using knowledge of students to engage them in learning 1.2 Connecting learning to students' prior knowledge, backgrounds, life experiences, and interests 1.3 Connecting subject matter to meaningful, real-life contexts 1.4 Using a variety of instructional strategies, resources, and technologies to meet students' diverse learning needs 1.5 Promoting critical thinking through inquiry, problem solving, and reflection 1.6 Monitoring student learning and adjusting instruction while teaching	2.1 Promoting social development and responsibility within a caring community where each student is treated fairly and respectfully 2.2 Creating physical or virtual learning environments that promote student learning, reflect diversity, and encourage constructive and productive interactions among students 2.3 Establishing and maintaining learning environments that are physically, intellectually, and emotionally safe 2.4 Creating a rigorous learning environment with high expectations and appropriate support for all students 2.5 Developing, communicating, and maintaining high standards for individual and group behavior 2.6 Employing classroom routines, procedures, norms, and supports for positive behavior to ensure a climate in which all students can learn 2.7 Using instructional time to optimize learning
STANDARD THREE:	STANDARD FOUR:
UNDERSTANDING AND ORGANIZING SUBJECT MATTER FOR STUDENT LEARNING	PLANNING INSTRUCTION AND DESIGNING LEARNING EXPERIENCES FOR ALL STUDENTS
3.1 Demonstrating knowledge of subject matter, academic-content standards, and curriculum frameworks 3.2 Applying knowledge of student development and proficiencies to ensure student understanding of subject matter 3.3 Organizing curriculum to facilitate student understanding of the subject matter 3.4 Utilizing instructional strategies that are appropriate to the subject matter 3.5 Using and adapting resources, technologies, and standards-aligned instructional materials, including adopted materials, to make subject matter accessible to all students 3.6 Addressing the needs of English learners and students with special needs to provide equitable access to the content	4.1 Using knowledge of students' academic readiness, language proficiency, cultural background, and individual development to plan instruction 4.2 Establishing and articulating goals for student learning 4.3 Developing and sequencing long-term and short-term instructional plans to support student learning 4.4 Planning instruction that incorporates appropriate strategies to meet the learning needs of all students 4.5 Adapting instructional plans and curricular materials to meet the assessed learning needs of all students
STANDARD FIVE:	STANDARD SIX:
ASSESSING STUDENTS FOR LEARNING	DEVELOPING AS A PROFESSIONAL EDUCATOR
5.1 Applying knowledge of the purposes, characteristics, and uses of different types of assessments 5.2 Collecting and analyzing assessment data from a variety of sources to inform instruction 5.3 Reviewing data, both individually and with colleagues, to monitor student learning 5.4 Using assessment data to establish learning goals and to plan, differentiate, and modify instruction 5.5 Involving all students in self-assessment, goal setting, and monitoring progress 5.6 Using available technologies to assist in assessment, analysis, and communication of student learning 5.7 Using assessment information to share timely and comprehensible feedback with students and their families	6.1 Reflecting on teaching practice in support of student learning 6.2 Establishing professional goals and engaging in continuous and purposeful professional growth and development 6.3 Collaborating with colleagues and the broader professional community to support teacher and student learning 6.4 Working with families to support student learning 6.5 Engaging local communities in support of the instructional program 6.6 Managing professional responsibilities to maintain motivation and commitment to all students 6.7 Demonstrating professional responsibility, integrity, and ethical conduct

Overview

Support for teachers in the SLOPE Project is based on coaching and collaboration using the Responsive Teaching Cycle (RTC). This approach is based on the idea that teachers learn and grow by becoming problem solvers rather than by being recipients of a "one-size-fits-all" solution. This theory of change is based on research that suggests the beliefs and practices of teachers are shaped *by their experiences in the classroom* (Thompson, 1992).

This RTC model utilizes teachers' own classrooms as the learning environment in which they engage in a cycle of inquiry that informs and is informed by knowledge of student learning. Using this inquiry-based model, teachers collaborate to design instruction. With this approach, teacher learning comes from improvised practice. Because RTC empowers teachers to be in charge of their own learning process, they gain the confidence to take additional risks in trying new teaching methods. SLOPE believes that the successes from this approach can help an entire school community to engage in collaborative inquiry that is focused on reaching students rather than simply progressing through a book.
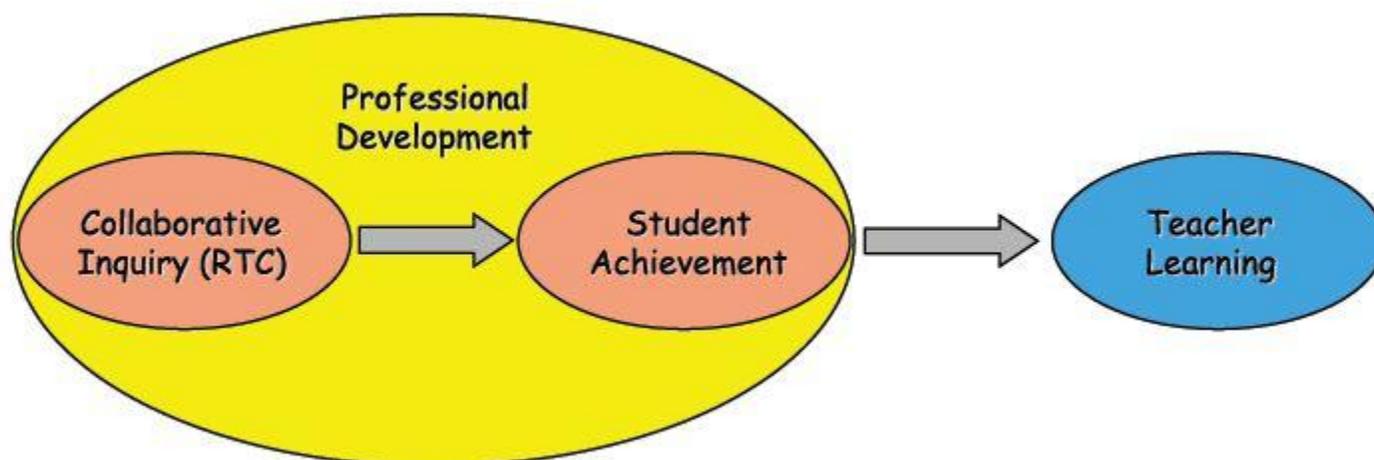

Figure 1. Professional Development model for the Responsive Teaching Cycle (RTC).

Responsive Teaching Cycle (RTC) Description

The "traditional model" of professional development focuses on increasing teacher knowledge to improve student achievement. In contrast, the "student centered model" we are espousing engages teachers in collaborative inquiry focused on improving student achievement. Teacher learning and professional development are natural *byproducts*, rather than the focus of this approach. The advantages of our model are cost effectiveness and sustainability—teachers are providing their own professional development. Our theory of change is based on the *Responsive Teaching Cycle* (RTC), which is supported by research: "Teachers learn well just as students do—by studying, doing and reflecting; by collaborating with other teachers; by looking closely at students and their work; and by sharing what they see" (Darling-Hammond, 1999, p. 12). RTC is also in line with NCTM *Principles and Standards*: "To improve their mathematics instruction, teachers must be able to analyze what they and their students are doing and consider how those actions are affecting students' learning" (NCTM, 1999, p. 18).

At the school site level the project is self-sustaining. RTC builds capacity *within* each school through the training of teacher leaders. The teachers themselves become the change agents. Our model builds on existing work by systematically expanding collaborative teams while training teacher leaders to facilitate those teams. The facilitator moves them along, so eventually teachers learn to do this on their own.

Plan
Research
Reconsider

Act
Refine
Revise

Knowledge of Student Thinking

Do
"Repackage"
Rehearse
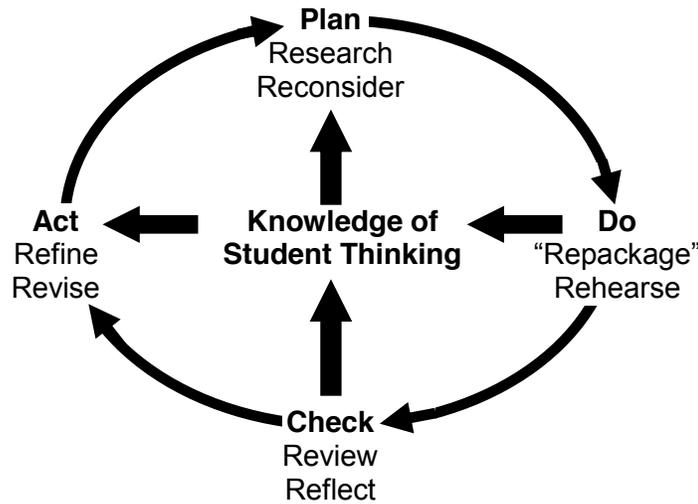
Check
Review
Reflect

Figure 2. The RTC process based on a Plan-Do-Check-Act cycle of inquiry (Wilms, 2003).

RTC utilizes *teachers' classes*—in summer school as well as throughout the year—as the learning environments in which teachers engage in a responsive teaching cycle that informs and is informed by their increasing knowledge of student thinking.

During the summer, when intervention classes are provided for students who have been unsuccessful during the previous year, trained facilitators engage teams of teachers in *weekly* collaboration in order to plan instruction based upon needs of students. Because the focus is always on being responsive to students' learning needs, teachers become more adept at monitoring student learning and using formative assessments to inform their instructional decisions. In short, they learn how to get through to their students, rather than get through a book.

The second key component of RTC occurs during the school year. Algebra teachers continue to meet in teams to collaborate online in further adapting instruction around the learning needs of their students. This ongoing collaboration provides opportunities for teachers to continue their own improvement. Research suggests that teachers learn and grow the more from the "*construction*" rather than the "*consumption*" of knowledge (Little, 1993, p. 135; Sparks, 1994; Knowles, 1990). Therefore, the RTC model focuses on providing teachers the time and resources that they need in order to rethink and revise their teaching strategies. And because teachers construct their own learning through practical experiences, they are more likely to continue using their newly acquired repertoire of lesson ideas and change the way they teach *all* of their students (Costa & Garmston, 2002a; Lockwood, 1998). This form of job-embedded professional development is more effective than traditional staff development workshops (Franke et al., 2001; Rényi, 1998, 1996) and teacher collaboration has been shown to be a powerful predictor of student outcomes (Berry et al., 2011). In fact, "a lion's share of an individual teacher's value-added gain to student learning, as measured by standardized test scores, was attributable to shared expertise" (p. 71).

RTC Results

The RTC model has been implemented in a number of middle schools and high schools in Los Angeles Unified School District since 2004. In every implementation, results have been positive. The number of students passing Algebra 1 has increased significantly as has the percentage of students scoring Proficient or Advanced on the California Standards Test (CST) in Algebra 1. More important, the schools implementing RTC have been able to close the achievement gap between Hispanic students and the general population. For example, the figures below show the percentage of **8th grade students** scoring _Proficient_ or _Advanced_ on **Algebra 1 CST** (comparing all LAUSD 8th graders, all Hispanic 8th graders, and 8th graders in schools implementing RTC).

2011 CST Results for RTC Model being Implemented in LAUSD#2
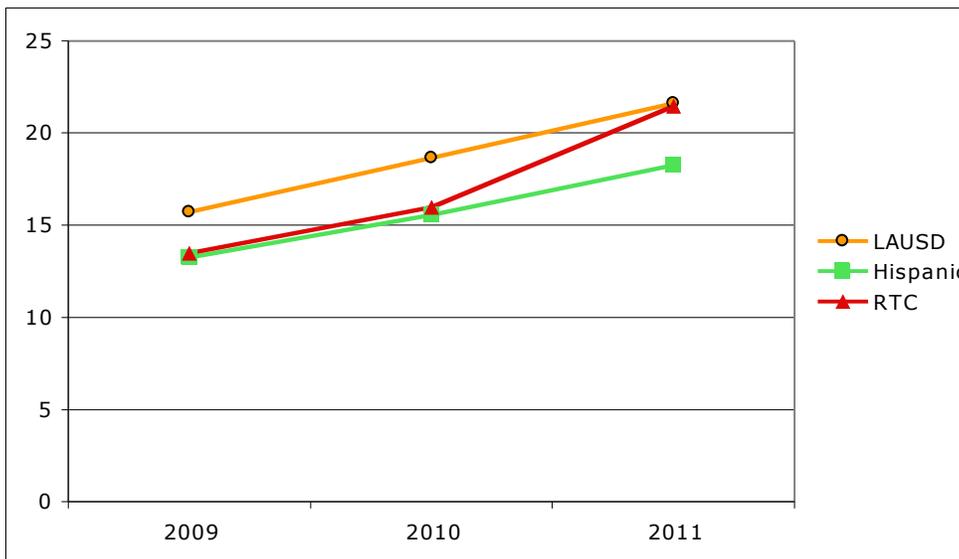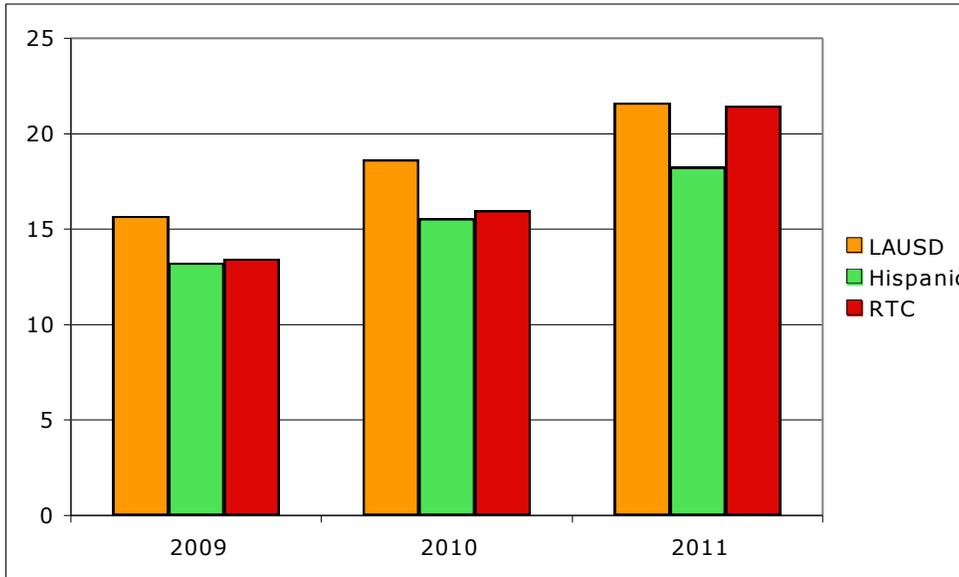
Facilitating RTC

An essential component of the RTC process is the use of skilled facilitators who can inspire vision and enable others to act (Wilson, 1993). These facilitators will practice a blend of *peer coaching* (Showers & Joyce, 1996) that focuses on innovations in curriculum and instruction, and *cognitive coaching* (Costa & Garmston, 2002a, 2002b), which helps teachers improve their practice through reflection. Through the use of reflective conversations and analysis of student work samples, coaches will assist the teachers in making their instructional decisions for subsequent lessons.

In order to be effective in supporting teachers, RTC coaches must share four essential qualities. First, coaches must be able to foster trust and respect from teachers by demonstrating genuine concern for the teachers' welfare and by possessing content knowledge and effective teaching experience. Second, coaches must be able to establish rapport with teachers by making personal connections through good interpersonal skills. Third, effective coaches must share common goals with the teachers and support their needs rather than promote outside agendas. Finally, RTC coaches must see themselves as a true member of the collaborative team who shares the concerns of the teachers, rather than as a disinterested outsider.

With these qualities, RTC coaches take on four key roles in the collaborative process. They serve as *leaders* by helping teachers clarify and define instructional goals. They help teachers develop specific objectives and expectations for lessons and inspire teachers to do their best. RTC coaches also serve as *facilitators* help teachers find resources and answers to their questions. Third, coaches are *role models* in setting examples for how to seek answers and learn from repeated trials and one's own mistakes. They "think out loud" in their collaborative work in order to unpack their own thinking and their practice. Finally, RTC coaches are to be *experts* in the sense that they are resources of content knowledge and effective teaching strategies. This does not mean coaches are necessarily perfect in their instructional practice or must possess all the answers. Rather, the coaches must serve as "brokers of expertise" in helping teachers access knowledge of content and practice. In order to do these things, coaches must be learners themselves and continually seek opportunities to develop their own capacity to coach others.

Reflective Conversations Guide for RTC

Coaching Skills of Mentoring	Paraphrasing
A trusting relationship • Using good listening skills • Empathetic acceptance • Congruence between body language and verbal language **Clearly defined roles and expectations** • Desire to promote the teacher's autonomy and uniqueness • Nonjudgmental conversation • Honesty **Linguistic Skills** • Paraphrasing • Clarifying • Pausing and using silence • Mediational questioning	**Paraphrasing communicates that the listener has:** **HEARD** what the speaker said, **UNDERSTOOD** what was said, and **CARES** Paraphrasing involves either: **RESTATING** in your own words, or **SUMMARIZING** Some possible paraphrasing stems include the following: • So… • In other words… • What I'm hearing then… • What I hear you saying… • From what I hear you say… • I'm hearing many things such as… • As I listen to you, I'm hearing…

Clarifying	Mediational Questions
Clarifying communicates that the listener has: **HEARD** what the speaker said, but does **NOT fully UNDERSTAND** what was said. Clarifying involves **Asking a Question** (direct or implied) to: 1. Gather more information 2. Discover the meaning of language used 3. Get clarity about the speaker's reasoning 4. Seek connections between ideas 5. Develop or maintain a focus Some possible clarifying stems include the following: • Would you tell me a little more about…? • Let me see if I understand… • I'd be interested in hearing more about… • It would help me understand if you'd give me an example of ... • So, you are saying/suggesting…? • Tell me what you mean when you… • Tell me how that idea is like (different from)… • To what extent… • I'm curious to know more about… • I'm intrigued by … / I'm interested in… / I wonder… NOTE: "Why?" tends to elicit a defensive response.	**Mediational questions help the colleague:** **HYPOTHESIZE** what might happen **ANALYZE** what worked or didn't **IMAGINE** possibilities **COMPARE & CONTRAST** what was planned with what ensued **EXTRAPOLATE** from one situation to another **EVALUATE** the impact Some meditational question stems include: • What's another way you might…? • What would it look like if…? • What do you think would happen if…? • How was…different from (like)…? • What sort of an impact do you think…? • What criteria do you use to …? • When have you done something like…before? • What do you think…? • How did you decide (come to that conclusion)…? • What might you see happening in you classroom if...?

Coaching for SLOPE

The work of RTC coaches for the SLOPE project occurs online and face-to-face. During the coaching sessions, the coaches provide guidance to teachers to address various instructional concerns. For example, coaches may assist teachers in connecting project activities with existing curricula and with district and state testing guidelines. Coaches may also work with teachers in developing supplemental materials or in refining lesson activities. Coaching sessions also provide assistance to teachers in accessing relevant, up-to-date knowledge and strategies for instruction. Finally, coaching sessions engage teachers in reflective conversations to help them identify areas for improvement and specific next steps for improvement.

Duties of SLOPE Coaches (both online and face-to-face)

- ***Help <u>teachers</u> stay focused on student learning (but stay focused on teacher learning)***. Well-meaning teachers <u>do</u> care about students, and it is insulting to be treated as incompetent. Teacher learning and growth occur when teachers engage in activities that focus on supporting student learning. At the same time, the leader must stay focused on teacher learning.
- ***Respect the teachers' beliefs and practices***. The key is to build on teachers' existing beliefs and practices and <u>then</u> nudge them toward new adaptations. This means not trying to change teachers, but to help them recognize the need to change. In other words, help teachers recognize the gap between where they are and where they want to be. Of course, this aspect of leadership always honors the teachers' best intentions.

- **Be patient and trust the process**. Even though teachers may start out with fairly traditional ideas about teaching, eventually they will come to recognize the benefits of doing things in a more connected way. Like student learning, this process occurs over time.
- **Assign competence to teachers**. Give teachers credit for successes that come from their ideas, no matter how embryonic those ideas may be. Be vigilant for opportunities to frame teachers' ideas as something consistent with the guiding principles of the desired teaching approaches. In other words, use teachers' ideas as springboards for developing activities that reflect reform teaching practices.
- **Be alert to opportunities for sharing ideas about content or pedagogy**. Content and pedagogy are often the focus of professional development. Ironically, this focus has had relatively limited impact on teacher knowledge or practice. However, when content and pedagogy are discussed in the _context_ of designing learning activities _for students_, teachers end up learning more and applying more of their knowledge. For example, discussing ways to approach the presentation of slope can lead to a deeper understanding about rates of change represented in context, in graphs, in tables, or in symbols.
- **Be willing to serve**. Often teachers may just have crude approximations of what they might want to implement. For example, the hard work needed to make the worksheets look professional even when the teachers just sketch out their ideas on napkins may be an opportunity to serve. In other words, focus on making the teachers look good and help them to shine.

As a facilitator, there are a few explicit moves that must be made during the meetings:

- **Help teachers clarify goals and remind them of guiding principles**. Discussions need to help teachers clarify the learning goals for their students. These goals can be content based or process based. Teachers need to be precise in what they're trying to accomplish as well realistic. There are some guiding principles that serve as a foundation for lesson design. For example, the CMI Framework reminds teachers whether they are developing an idea or formalizing a concept. It is important to help teachers be clear on what they are doing.
- **Ask questions that focus on student learning**. What did the students understand? What are their misconceptions? How do you know?
- **Invite teachers to share their ideas**. The learning process is built on reflection of practices that teachers experiment with. Without the opportunity to experiment, and fail, the teachers will never step out of their comfort zone. The work of a group makes it safe to experiment. Teachers need to feel safe in sharing their thoughts and ideas, and be encouraged to do so. Then work together to find ways to incorporate those ideas into a final product.
- **Share ideas but make them accessible**. The leader is a member of the team as well. It is important to insert ideas into the conversation that could help spark other ideas from teachers. Help teachers take incremental steps in the right direction. Use guiding principles that make sense to teachers. For example, promote the use of multiple representations simultaneously (rather than in sequence) as a strategy to provide additional practice in the use of those representations. Thus, introducing tables and graphs as tools gives students the opportunity to deeply understand their uses as well as gain opportunities to practice using them.
- **Be responsive to teachers' concerns**. Teachers are inundated with discipline issues, testing schedules, assemblies, fire drills, and any number of concerns unrelated to instruction, but which have impact on instruction. These all must be taken into consideration when designing lessons.
- **Refocus the group**. When the discussion gets off track, nudge them back with a focus on the task that needs to be completed. Typically, the task is a lesson activity that will be implemented the next day and provides urgency for its completion.

Aspects of Coach Development (based on "five states of holonomy" from Cognitive Coaching)

- Craftsmanship (expertise in content and pedagogy)
- Consciousness (self-aware and reflective)
- Efficacy (confidence without arrogance)
- Flexibility (sees the possibilities)
- Interdependence (true team player rather than a "lone ranger")

Training for Coaches

- Engage in project-based pre-algebra training
- _Experience_ collaboration (to foster interdependence)
- Cognitive Coach training or similar (to understand the process and develop confidence in the process) (Fall 2011)

- Ongoing mentorship from more experienced coaches (2011–2014)
- Any additional training (if needed) that will support or develop coaches based upon teacher participant needs (e.g., explicit ELL support, differentiated coaching strategies)

Time Commitment

- Attend training in project-based pre-algebra units (4 days, Summer 2011) at $200 per day or cost of a substitute for the same time period.
- Implement project-based lessons (Summer 2011 and AY 2012–13) if teaching
- Facilitate 1 to 3 hours of collaboration per week per teacher (30 weeks) during the academic year (2012–13 and 2013–14)
- Use technology to meet with teachers online (1 to 3 hours per week per teacher); iPad2 provided
- Attend team meetings with other coaches (face-to-face once per semester, online weekly) at $50 per hour
- Attend any additional trainings, including 5 day kick-off retreat to be scheduled during the spring of 2012 ($100 for half day or $200 for full day if on non-duty time) and 2 day meeting in year 2 scheduled for spring of 2013.

Professional Development for Coaches for Pilot Year January –February, 2012

Coaches Orientation (January 2012)	2 days
Webinars for Pilot – 2 half day	1
	3 days

Professional Development for Coaches for Year 1

Project Kickoff Meeting (Spring 2012)	6 days*
Coaches Retreat (Fall 2012)	3
Four half–day trainings (one for each unit)	2
	11 days

*most likely will be during the week and involve substitutes; most days will be on weekends or evenings.

Professional Development for Coaches for Year 2

Project Year 2 Meeting (Spring 2013)	3 days*
Coaches Retreat (Fall 2013)	3
Four half–day trainings (one for each unit)	2
	8 days

*most likely will be during the week and involve substitutes; most days will be on weekends or evenings.

Project Timeline for Coaching Component

Winter 2012
- Training in RTC model, SLOPE project, research protocols, and coaching skill development.

Spring 2012 Project Kickoff
- 5 day training and project orientation

May 2012
- Coaching hours can begin to occur in preparation for Summer CAMP- 1 hour per week per CAMP teacher

Fall 2012-May 2013
- Year 1 of study and coaching occurs 4 to 12 hours a week for 30 weeks to support project teachers that are in the treatment cohort
- Coaching Network meetings will occur quarterly TBD

May 2013

- Coaching hours can begin for Summer CAMP- 1 hour per week per CAMP teacher Note- all coaches may be needed for CAMP coaching

Fall 2013-May 2014

- Year 2 of study and coaching occurs 4 to 12 hours a week for 30 weeks to support project teachers that are in the treatment cohort
- Coaching Network meetings will occur quarterly TBD

Online Collaboration

You will be expected to utilize an online forum (such as Brokers of Expertise) in order to stay current on discussion postings, document sharing and any other coaching tasks.

Coaching Conversations

Minimum of 1-3 hours per teacher per week – not to exceed 12 hours a week
- Collaborative work with (outside of duty hours) or as agreed upon by your employer

Documentation

- Professional Biography (1-2 pages typed); describe your current teaching assignment, why you chose to become a teacher, and most memorable experiences as a teacher.
- Coaching Reflections: record key points of discussion from each coaching conversation and any insights or lessons learned.

Compensation

- Coaches will be paid $4000 a year. Travel and training expenses will be covered by the grant. An iPad2 will also be provided as part of the coaches' compensation. Those participating in summer coaching will receive a separate compensation and coaches will be identified on an as-needed and as-available basis. Summer coaching is 1 hour a week per assigned teacher for 5 weeks and will be compensated at the rate of $400 for the summer program.

Coach Application Guide

Essential Qualities for SLOPE Coaches

An applicant to be a SLOPE Coach must:
- Have previously taught Algebra I successfully,
- Possess strong interpersonal communication skills,
- Be respected and held in high regard by colleagues and peers,
- Be actively engaged in seeking opportunities to improve teaching and learning,
- Be a reflective practitioner.

Desirable Qualifications

An applicant to be a SLOPE Coach should:
- Have demonstrated commitment to personal professional growth and learning (e.g., National Board certification, advanced degrees, conference attendance, etc.),
- Possess coaching and/or mentoring experience,
- Have experience presenting at conferences or other professional development activities,
- Have taught mathematics courses beyond Algebra I,
- Have experience in working collaboratively with teachers in planning lessons or assessments,
- Be aware of resource materials that can inform instructional planning,
- Possess proficiency in using productivity software (e.g., Microsoft Word),
- Be able to work comfortably in an online environment.

Eligibility Requirements

In order to be eligible, an applicant to be a SLOPE Coach must:
- Be a high School math teacher with at least 5 years of successful teaching experience
- Be able to commit to the following:
  - Work collaboratively with assigned Project Teacher(s) for two years from May 2012-August 2014 when the research study is completed
  - Work collaboratively with a Project Teacher(s) for 1-3 hours per week
  - Become familiar with state-adopted academic content standards and performance levels for students, content specific pedagogy, and the specific needs of the student population taught by the Project Teacher(s) to whom they are assigned
  - Participate in professional training to acquire the knowledge and skills needed to be an effective and successful SLOPE Coach.
  - Engage in formative assessment processes with assigned Project Teacher(s) including non-evaluative, reflective conversation about formative assessment evidence
  - Share instruction ideas and materials with Project Teachers
  - Deepen understanding of cultural, ethnic, cognitive, linguistic, and gender diversity
  - Be an excellent professional role model
- Complete and submit the application.
- Provide three letters of recommendation–one from site or district administrator, and two letters from colleagues,
- Complete the interview process.

The SLOPE Project reserves the right to retain coaches who are successful within the coaching model we are implementing, as measured by multiple sources of evidence, including feedback from the site administrator and each Project Teacher.

Coaches will be assigned to Project Teachers by Dr. Ivan Cheng, who will oversee the work of the coaches as well as maintain quality control of the coaching.

STEM Learning Opportunities Providing Equity (SLOPE): Innovations that Complement the Implementation of High Standards

Submit three letters of recommendation (one from a site or district administrator, two from colleagues) along with your application to: Sharon Twitty, i3 Project Director @ **stwitty@arches-cal.org**

SLOPE Coaching Application

Applicant Information

First Name		Last Name		
Address	City	State		Zip
Phone Home ( ) -	Work ( ) -		Cell ( ) -	
Email (A regularly monitored email address is required)			DOB	Gender Female ☐ Male ☐

Employment Information

School Name	District	Site Administrator
Grade Level	Subject(s) Taught	Number of Years Teaching Full Time
I am currently serving as a: ☐ Full-time Classroom Teacher ☐ Part-time Classroom Teacher ☐ Retired		☐ Full-time Academic Coach ☐ Part-time Academic Coach

Coaching Experience

Have you served as a math instructional coach in the past? ☐ Yes   ☐ No   ☐ I am trained in the following coaching model(s).   List   ☐ I have coached for   years.
Have you ever been coached as a teacher? ☐ Yes ☐ No   When was the last time you were coached?

Credential Information / Supplemental Authorization(s)

Credential Information	Supplemental Authorization(s)
☐ Clear Multiple Subject ☐ Clear Single Subject ☐ Added Authorization. Subject(s): Authorized to teach up to which course?	☐ CLAD ☐ BCLAD ☐ Other

Please list other recognitions, honors, and awards you have received:

Undergraduate Degree(s)	Subject(s)
Graduate Degree(s)	Subject(s)
National Board Certified? ☐ Yes ☐ No	Area of certification:
	Date:

Please identify significant professional development activities/events you have completed or led in the last 5 Years.

Event/Activity	Date mm/dd/yy	District Initiated	Self-Initiated
1.		☐	☐
2.		☐	☐
3.		☐	☐
4.		☐	☐
5.		☐	☐
6.		☐	☐
7.		☐	☐
8.		☐	☐
9.		☐	☐
10.		☐	☐
11.		☐	☐
12.		☐	☐
13.		☐	☐
14.		☐	☐
15.		☐	☐
16.		☐	☐
17.		☐	☐

Professional Learning Experience

Please answer the questions on the back and/or attach additional paper if necessary.

1. Please explain your motivation for applying to this position.

2. Think back to a lesson you taught when your students did not achieve the learning objectives. What possible factors may have led to this outcome and what did you subsequently do about it?

3. Please describe what actions you would take in the following scenario:

> *The administration is encouraging teachers at your school to increase the level of cognitive demand in lessons based on Bloom's Taxonomy. You are helping a colleague do that in a lesson on solving systems of equations*.

Letters of Recommendation

Upon receiving this document, please email completed application along with 3 letters of recommendation (one from a site or district administrator and two colleagues) and attach current resumé by **October 28, 2011**: Sharon Twitty stwitty@arches-cal.org and Administrative Assistant Alexandra Higgins alexandra@capimpactllc.com

I have read and understand the **SLOPE Coach Roles and Responsibilities** and would like to participate in the ARCHES i3 SLOPE Project. I have submitted three letters of recommendations including one from a site or district administrator and two from colleagues) along with a current resumé. I will attend all trainings and meetings, submit online documentation, and engage in 4 to 12 hours of coaching per week. I agree to fulfill the requirements of the Responsive Teaching Cycle (RTC) model and SLOPE program. <u>I understand that I must successfully complete all of the requirements of the project by the due dates in order to receive my full stipend.</u> I understand that SLOPE is a U.S. Department of Education research project and I agree to comply with all research protocols established by the USDE.

Applicant Signature*:	**Date:**

* I understand and agree that my typed full name serves as my electronic signature.