California Mathematics & Science Partnership (CaMSP) Statewide Evaluation

Year Six Report
Cohorts 3 to 6 and Research
Through September 30, 2010

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Abstract

In January 2002, the No Child Left Behind (NCLB) Act of 2001 became law. The Improving Teacher Quality (ITQ) grant programs under Title II of NCLB are an important component of the legislation. These programs encourage scientifically-based professional development for teachers as a means for improving student academic performance. Title II, Part B, of NCLB authorizes state education agencies to administer a statewide Mathematics and Science Partnership (MSP) competitive grant program. The Mathematics and Science Leadership Office (MSLO) of the California Department of Education (CDE) administers the California Mathematics and Science Partnership (CaMSP), one of the state's two competitive grant programs funded under NCLB's ITQ initiative. A separate competitive grant program administered by the California Postsecondary Education Commission (CPEC) provides opportunities for professional development open to all academic subject areas.

The California Mathematics and Science Partnership (CaMSP) program is designed to increase the academic achievement of students in mathematics (grades three through Algebra I) and science (grades three through eight) by enhancing the content knowledge and teaching skills of classroom teachers through professional development activities. As overall student achievement rises, CaMSP programs are expected to reduce achievement gaps in the mathematics and science performance of diverse student populations.

Partnerships developed between high-need Local Education Agencies (LEAs), defined by 40 percent or higher participation in the National School Lunch Program (NSLP), and the mathematics, science, and engineering faculty of Institutions of Higher Education (IHEs) are core to the improvement efforts sought by the CaMSP program. County Offices of Education (COEs) and other organizations concerned with mathematics and science education may also participate in partnerships. Successful CaMSP programs are designed to serve as models that can be replicated in educational practice to improve the mathematics and science achievement of California students.

Within the guidelines of CDE's request for applications, each partnership is developed to meet local needs and take advantage of opportunities for collaboration with IHEs. In their applications for funding, partnerships determine the number of districts, schools, and teachers targeted—serving a minimum of 30 teachers in the most recent cohorts.

To date, nine separate cohorts of partnerships have been authorized by CDE—Cohorts 1 through 8 and the Research Cohort. Cohorts 1 and 2 concluded in Fall 2008. Six partnerships from Cohorts 1 and 2 were awarded continued funding under the Research Cohort, which was a competitive grant process to identify outcomes associated with the professional development models that had been previously developed.

This evaluation report focuses on implementation during 2009-10 and includes qualitative data collected from Cohorts 4, 5, 6 and Research and analysis of student outcome data from Cohorts 3, 4, 5, 6 and Research. Cohort 7 will be added to the 2010-11 evaluation. Cohort 8 was announced in January 2011 and will be incorporated in the evaluation in 2011-12.

Statewide Evaluation

In addition to the requirement that each partnership develop a local evaluation strategy, California is conducting a statewide evaluation. Through two request for proposal processes, CDE selected Public Works (PW) to conduct Part 1 (Years 1-4) and Part 2 (Years 5-8) of the evaluation of the California Mathematics and Science Partnerships (CaMSP) as required by NCLB Title II, Part B. PW is a nonprofit corporation working with schools, government agencies and communities to improve education through increased evaluation and accountability.

The evaluation incorporates both process measures focused on how the program is implemented and outcome measures focused on the results of the program and interventions. Using both qualitative and quantitative data collection methods, the evaluation includes site visits, telephone interviews, observations of professional development, statewide partner and teacher surveys, analysis of teacher demographic and participation data, and a matched control/treatment study of student outcomes. The student outcome study employs a quasi-experimental design to evaluate the effect of CaMSP on student academic achievement in mathematics and science.

Key Features of CaMSP

CaMSP partnerships are focused on understanding baseline student achievement and teacher workforce data in order to document improvements in student achievement in mathematics and science over time. Each CaMSP partnership is required to address the following five key features:

1. ***Partnership-Driven:*** Programs are designed and implemented by partnerships that unite administrators, teachers and guidance counselors in participating LEA partner organizations and disciplinary faculty, education faculty and administrators in IHE partner organizations. Partnerships draw upon the expertise of all members to meet the purposes of this program. Scientists, mathematicians, engineers and individuals from other partner organizations, including COEs, may also play significant roles in program activities. Partners are deeply engaged in the effort at both the institutional and the individual levels and share goals, responsibilities and accountability for the program.

2. ***Teacher Quality:*** Programs enhance the quality and expertise of teachers who teach mathematics and science. Drawing upon the expertise of mathematics, science and engineering faculty in IHE partner organizations, teachers are engaged in high-quality professional development activities to develop strong mathematics and science content knowledge and related pedagogical strategies. Program activities ensure that educators develop the necessary knowledge and skills to teach challenging courses effectively using SBE-adopted standards and instructional materials. Partnerships also develop and implement innovative strategies that include increasing the diversity of the teacher workforce and encouraging young women and other underrepresented individuals to achieve in mathematics and science.

3. ***Challenging Courses and Curricula:*** Programs ensure that students are prepared for, have access to, and are encouraged to participate and succeed in challenging mathematics and science courses. Various approaches that integrate reasoning, problem solving, hands-on and procedural skills are applied. Evidence of high-quality professional development is demonstrated by the instruction of well-trained teachers whose students have access to high-level mathematics and science content. Classroom instruction at all grade levels incorporates appropriate levels of rigor and challenge building on skills from one level in preparation for the next.

4. ***Evidence-Based Design and Outcomes:*** Program design is informed by current research. Program outcomes should contribute to the knowledge base of teaching and learning. Through participation in the California and National MSP Learning Networks, programs will collectively contribute to the knowledge base on teaching and learning so that research findings and successful evidence-based strategies can be broadly disseminated to improve educational practice. Programs also link assessment (classroom, local, and state) and accountability measures to their design and outcomes.

5. ***Institutional Change and Sustainability:*** To ensure program sustainability, partner organizations leverage resources and design and implement new policies and practices leading to well-documented, inclusive and coordinated institutional change at both the IHE and the LEA level. IHE partner organizations commit to engaging mathematics, science or engineering faculty, or any combination thereof, in activities that strengthen their teaching practices and their roles in mathematics and science education, including teacher preparation and professional development. Partner organizations commit to providing environments for teachers, guidance counselors and administrators that support an evidence-based approach and in which exemplary contributions to mathematics and science learning and teaching are recognized and rewarded. Other partners commit to engaging mathematicians, scientists, engineers and other individuals in activities that strengthen their roles in mathematics and science education for the long term.

Organization of the Report

This evaluation report is divided into five sections and appendices.

Section 1: Introduction & Evaluation Methods: The first section of the report is an introduction to the CaMSP program and provides information about the California context for implementation, an overview of program requirements, and a detailed description of the evaluation design and methods.

Section 2: Evaluation Results Overview: This section of the report provides a summary of implementation findings across the five key features of CaMSP including Partnership Driven, Teacher Quality, Challenging Courses and Curricula, Evidence-based Design and Outcomes, and Institutional Change and Sustainability.

Section 3: Evaluation Spotlight on Institutional Change & Sustainability: This section provides analysis from the qualitative study through the lens of institutional change as a result of CaMSP partnerships among IHE partners and efforts to embed and ensure sustainability of professional development policies and systems in LEA partners.

Section 4: Results of the Statewide Student Outcome Study: This section includes findings from the statewide student outcome study for Cohorts 3, 4, 5, 6 and Research, which includes a comparison of treatment teachers to a matched comparison group of non-participating teachers and regression analysis results.

Section 5: Recommendations & Next Steps: This section concludes the report with recommendations based on the findings and provides a description of next steps in the evaluation.

Appendices: Cohort maps and tables.

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Section 1:

Introduction & Evaluation Methods

Introduction

The California Mathematics and Science Partnership (CaMSP) is a competitive grant program to implement innovative professional development programs funded through Title II, Part B, of the No Child Left Behind Act of 2001 (NCLB). Through a competitive Request for Proposal (RFP) process, CDE hired Public Works (PW), a non-profit consulting company in Pasadena, California, to be the initiative's third party evaluator. The results in this annual report reflect activities from Years 1 to 6 through September 30, 2010. Previous reports and additional information about CaMSP are available on the Public Works Web site (www.publicworksinc.org).

CaMSP Implementation Context

Student Performance in Science and Mathematics

As backdrop to the implementation of professional development for teachers related to mathematics and science instruction, recent reports detailing the performance of students in the United States compared to their international counterparts paint a picture of mixed performance on assessments such as the Trends in International Mathematics and Science Study (TIMSS) and the Program for International Student Assessment (PISA). TIMSS, sponsored by the International Association for the Evaluation of Educational Achievement (IEA), was first conducted in 1995 and assesses the mathematics and science performance of both 4th and 8th graders every four years. PISA is sponsored by the Organization for Economic Cooperation and Development (OECD) and was first conducted in 2000 to assess the reading, mathematics, and science literacy of 15-year-old students every three years. While TIMSS has a larger proportion of developing countries participating in it, PISA is considered a study of the member countries of the OECD, which is an intergovernmental organization of 30 developed countries.[1]

In a supplement to the 2009 edition of *The Condition of Education,* the National Center for Education Statistics prepared a special analysis to take a closer look at the performance of US students on these international assessments. In 2007, TIMSS results indicate that US performance for both 4th graders and 8th graders in mathematics had improved since 1995 (and were both above the TIMSS scale average). However, in the 2006 PISA, US 15-year-old students' average mathematics literacy score was lower than the OECD average and placed US students in the bottom quarter of participating OECD nations (developed nations) and in a position that was relatively unchanged from 2003.

In science, TIMSS results in 2007 showed scores that were above the scale average set for the assessment for both 4th graders and 8th graders, but there was no measurable change from the scores in 1995. Again, on the 2006 PISA, US 15-year-olds' scores were lower than the OECD average and placed the US students in the bottom third of participating OECD nations in science literacy.[2] Reporting related to the results of the 2009 PISA raised further concerns about the performance of US students with commentators highlighting the relatively small proportions of US students who scored in the two highest achievement categories in mathematics (ten percent in mathematics and nine percent in science) and the lack of US leadership in producing "top-tier" performers in mathematics and science.[3]

In January 2011, results of the National Assessment for Educational Progress (NAEP) in science were released representing a revamped assessment based on a new framework that was aligned to research on science learning and drawn from content on the PISA and other international assessments. Scores were weakest among 12th graders compared to their elementary and middle school peers, with only one in five

1 *Provasnik, S., Gonzales, P., and Miller, D. (2009). U.S. Performance Across International Assessments of Student Achievement: Special Supplement to The Condition of Education 2009 (NCES 2009-083). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC.*

2 *Ibid.*

3 *Robelen, Erik W. High Achievers Scarce in Math, Science in U.S., published in Education Week, online January 11, 2011 and in print January 12, 2011.*

high school seniors scoring at least proficient on the exam compared to 34% of 4th graders and 30% of 8th graders. California performance on the 2009 NAEP in science was ranked just above that of Mississippi (52% of 8th graders scored below basic in California compared to 59% in Mississippi).[4]

In contrast to the performance on international and national assessments, a study of US high school transcripts conducted by the NAEP indicates an overall trend of high school graduates to earn more credits with higher average numbers of credits in all four core academic areas (mathematics, science, English and social studies). For example, in 2009, high school graduates earned an average of 3 credits more than in 1990 (27.2 credits compared to 23.6). Each credit represents 120 hours of classroom instruction. Not surprisingly, students with more credits in mathematics and science scored higher on the NAEP in both subject areas.[5]

Federal and State Student Accountability Systems

In 1999, California instituted a far-reaching accountability system known as the Student Testing and Accountability Reporting (STAR) System, which was based on a "growth" model for improvement. Schools in California are ranked based on the Academic Performance Index (API), which is released annually to the public.

When it began, the STAR system was largely focused on norm-referenced tests that were not necessarily aligned to state content standards. Over time, the STAR system has evolved to incorporate California Standards Tests (CST) aligned to State Board of Education (SBE) standards in core content areas. Though scores in English language arts and mathematics are the most heavily weighted in grades 2-8 in calculating the state's API, the STAR system now incorporates 5th and 8th grade science assessments and an 8th grade history and social science assessment.[6]

For most school districts in California, the results of the API are overshadowed by the accountability provisions of NCLB, which are based on absolute targets for performance on reading and mathematics assessments for all students and specified subgroups. Results from the STAR system are used to calculate Adequate Yearly Progress (AYP) under the federal accountability requirements of NCLB, which currently mandates that all students achieve proficiency in reading and mathematics by 2014.

While schools continue to operate under the provisions of NCLB, reauthorization of the Elementary and Secondary Education Act is currently the subject of debate in Congress with a commitment by the Obama Administration to push for reauthorization by the time schools open in the Fall 2011. The Obama Administration released its blueprint for revising the Elementary and Secondary Education Act (ESEA) on March 13, 2010 titled ESEA Reauthorization: A Blueprint for Reform. In it, states will be asked to:

- Set standards that prepare students for college and careers.
- Create a fair accountability system that recognizes and rewards growth and progress.
- Provide flexibility to educators to innovate and create local solutions.
- Focus interventions and support for the lowest-performing schools that are not demonstrating progress.

For many educators, the "pressure of the NCLB law has had the effect of squeezing science, social studies, and the arts out of the elementary school curriculum. And many educators assume that children

4 *Robelen, Erik W. Proficiency Eludes U.S. Students on Science NAEP, published in Education Week, online January 25, 2011 and in print January 26, 2011.*

5 *The Nation's Report Card. 2009 High School Transcript Study. http://nationsreportcard.gov/hsts_2009/ (April 2011).*

6 *The API also includes science through grade 11 and grades 9-11 history/social science, the CAHSEE, the CAT6, and the CAPA. California Department of Education, Overview of California's 2007-08 Accountability Progress Reporting System (May 2008).*

can 'catch up' on science when they reach middle school and high school."[7] Despite the anticipation of reauthorization of the current federal legislation, states and districts continue to operate under the requirements of NCLB.

Adoption of the Common Core Standards in California

On February 17, 2009, President Obama signed into law the American Recovery and Reinvestment Act of 2009 (ARRA), which provided $4.35 billion for the Race to the Top Fund, a competitive grant program designed for states that encouraged innovations and reforms advocated by the Administration to spur improvements in student outcomes, work toward closing achievement gaps, and implement other aspects of its education reform agenda. As part of Phase I and Phase II grant competitions, states were encouraged to pass legislation to adopt common standards to prepare students to succeed in college and the workplace, allow for alignment of data systems to measure student growth and success, and turning around the lowest-achieving schools.

In the spring of 2009, governors and state commissioners of education from 48 states, two territories and the District of Columbia committed to developing a common core of state K-12 English language arts (ELA) and mathematics standards. The Common Core State Standards Initiative (CCSSI) is a state-led effort coordinated by the National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO).[8]

Spurred in part by the Race to the Top Initiative competition, California adopted the Common Core State Standards (CCSS) on August 2, 2010, with some additions specifically designed to address concerns in California related to English language arts and mathematics. Mostly characterized as refinements to the CCSS, California added options for 8th grade students to complete Algebra I, which combined the 8th grade common core, the Algebra content cluster, and California's existing Algebra I standards. California also made some changes to the common core standards in high school by adding standards for "calculus" and "advanced placement probability and statistics" and some other refinements at different grade levels.[9]

While California adopted its version of the CCSS, the timeline for implementation of the accompanying curriculum frameworks, assessments, and instructional materials has been planned to occur in the next several years. Ultimately, the timeline depends on the availability of funding and the implementation of the accompanying assessment systems, which are currently under development by two federally-funded consortia. As it stands currently under California's Race to the Top application (which was ultimately not funded by the US Department of Education), California had planned to adopt a curricular framework for mathematics in January 2012, new instructional materials by August 2014, and have the materials ready for schools to adopt in December 2014. The implementation schedule is currently in flux depending on budget negotiations at the state level and how priorities that are established at the federal level impact California implementation.

In September 2010, the US Department of Education awarded grants to the Partnership for Assessment of Readiness for College and Careers (PARCC) and the SBAC to develop assessment systems that states participating in either consortium will administer statewide in 2014-15. California is participating in the SMARTER Balanced Assessment Consortium (SBAC). As of June 2011, 30 states have signed up to become members of SBAC. California is one of 18 governing states, which allows for decision-making. The system will include assessments in English-language arts (ELA) and mathematics in grades three through eight and once in grades 10 through 12. The new assessments will be in place for the 2014-2015 school year.

7 *Pratt, Harold, Science Education's Overlooked Ingredient, Why the Path to Global Competitiveness Begins in Elementary School, Education Week (Published online October 9, 2007 and in print October 10, 2007).*

8 *www.corestandards.org*

9 *Frequently Asked Questions Regarding the Common Core Standards, prepared by the Sacramento County Office of Education, August 2010.*

The SMARTER Balanced assessment system will be defined to meet both federal and state-level accountability requirements and provide teachers and parents with more timely and accurate information to measure and track individual student growth. The assessment system will utilize computer adaptive technologies to design assessments to measure student abilities across the full spectrum of student performance, evaluate growth in learning, and provide more information to teachers, administrators, and parents within weeks of testing.[10]

Algebra in California

Adding further complexity to standards and accountability-based reforms, which is also reflected in the adoption of California's version of the Common Core Standards, for more than the past ten years, California has been engaged in a controversial and often-heated debate regarding how to ensure that all students have the opportunity to take and master Algebra I. For California, this debate represents two equally compelling notions of equity: (1) first, the basic idea that high school graduation be a meaningful representation of the more rigorous curriculum embedded in California's system of standards, frameworks, and state-adopted instructional materials, and (2) second, an effort to ensure that diverse student populations have access to the content required for postsecondary education and are not unwittingly shut out from the prospect of attending four-year institutions and succeeding in postsecondary education.

Ten years ago, California mandated the California High School Exit Exam (CAHSEE), which incorporated two tests in English language arts and mathematics that were required for high school graduation. The mathematics portion was aligned to State Board of Education standards up to Algebra I and ushered in the emphasis on "Algebra for All" in California.

One of the impacts of this requirement has been to provide a strong incentive to schools to make Algebra I its 8th grade course despite the large numbers of students who do not demonstrate proficiency on 7th grade mathematics standards. A study of the impact of the efforts to raise academic standards and close the achievement gap in mathematics found that the percentage of 8th graders tested on the Algebra I CST increased from 34% of 8th graders statewide in 2003 to 50% in 2006. Despite this increase, the percentage of students scoring proficient or advanced on the Algebra I CST increased only slightly (from 41% in 2003 to 43% in 2006). "However, far too many students remained unsuccessful (i.e., less than proficient) in Algebra as 8th graders. As a result, one of the new features of the 2006 California Mathematics Framework is an explicit acknowledgement that all students may not be ready for Algebra as 8th graders, along with a curriculum outline for an Algebra Readiness program for lower achieving students."[11]

Despite the challenges of the Algebra I mandate, some see progress, especially related to access to and enrollment at earlier grades. "Nearly 45,000 more California 8th graders scored proficient or advanced on the state's Algebra I test in 2008 than in 2003. Nearly 26,000 more low-income 8th graders did so. However, too many California students still struggle to get through the Algebra I gateway leading to more rigorous mathematics and science courses in high school. Participation for all clearly does not translate automatically into success for all."[12]

California Textbook Adoption

Since the adoption of its standards over ten years ago, California has developed a complex system for districts to adopt textbooks and instructional materials in kindergarten through 8th grade. In 2002, AB

10 *More information available at: http://www.k12.wa.us/smarter/.*

11 *Kriegler, Shelley and Theresa Lee, Using Standardized Test Data as Guidance for Placement into 8th Grade Algebra, University of California Los Angeles, Department of Mathematics (2006).*

12 *Rosin, Matthew, Heather Barondess and Julian Leichty, Algebra Policy in California, Great Expectations and Serious Challenges, EdSource Report, Mountain View, CA (May 2009).*

1781 established the Instructional Materials Funding Realignment Program (IMFRP), which provides that Districts or County Offices of Education (COEs) that access these funds must use them to ensure that each pupil in grades kindergarten through eight is provided with a state-adopted standards-aligned textbook or basic instructional materials in reading/language arts, mathematics, science or history-social science.

Under this law, state-adopted materials must be provided by districts by the beginning of the school term that begins no later than 24 months after adoption by the State Board of Education. Standards-aligned instructional materials for grades 9-12 must be adopted by a resolution of the local governing board. However, because of its dire budget situation, California has taken extraordinary measures in Assembly Bill X4 2 (Senate Bill 2, Statutes of 2009-10 Fourth Extraordinary Session) signed on July 28, 2009, suspending the process and procedures for adopting instructional materials, including framework revisions, until the 2013-14 school year.[13] Adoption of California's version of the Common Core Standards for mathematics and English language arts in August 2010 has added further complexity to the current curricular framework and instructional materials adoption timelines that have yet to be worked out at the state level and in anticipation of the work of the SMARTER Balanced consortium.

The SBE adopted the Mathematics Content Standards for California Public Schools, Kindergarten through Grade Twelve (California Mathematics Standards) on December 11, 1997. The latest revision of the standards-aligned Mathematics Framework was adopted on March 9, 2005, and is designed to support teachers, provide comprehensive instructional materials, and establish evaluation criteria for the publishers of instructional materials. Prior to the 2007 mathematics adoption, the last primary mathematics adoption occurred in 2001 with a follow-up adoption in 2005.[14]

In October 1998, SBE adopted the Science Content Standards for California Public Schools, Kindergarten through Grade Twelve. In 2004, an updated edition of the Science Framework for California Public Schools, Kindergarten Through Grade Twelve, included Criteria for Evaluating Instructional Materials in Science, Kindergarten Through Grade Eight, an evaluation instrument for determining whether instructional materials align to the content standards and the framework. Science instructional materials were adopted in 2006.

Prior to the suspension of adoption requirements, many of the districts in CaMSP partnerships had adopted and purchased science instructional materials and were in the process of adopting and purchasing mathematics materials. Schools and COE's had been required to provide each student with science materials from the 2006 adoption by the start of the school term in Fall 2008 and mathematics materials by the start of the school term in Fall 2009.[15]

Mathematics and Science Teaching Workforce

California's K-12 education system has undergone a series of sweeping reforms in the last decade that have increased expectations and accountability for students, schools, and teachers. Both demographic trends and increased evidence of the link between teacher quality and improved student outcomes have led to a higher demand for qualified teachers. Recently, the Commission on Teacher Credentialing reported a new low of 20,000 newly issued credentialed in 2009-10, down from a high of 31,297 newly prepared teachers in 2003-04. Noting a continuing trend, the Commission on Teacher Credentialing reported a decrease in the number of emergency-type permits issued in 2009-10 (1,379 down from 9,027 in 2005-06).[16]

13 *http://www.cde.ca.gov/ci/cr/cf/imagen.asp.*

14 *The 2007 mathematics adoption included Basic Grade Level materials, Intervention Programs, and Algebra Readiness Program (http://www.cde.ca.gov/CI/ma/im/ccrrecommendtable.asp).*

15 *California Department of Education 2006 Science Primary Adoption and 2007 Mathematics Primary Adoption materials (http://www.cde.ca.gov/ci/cr/cf/index.asp).*

16 *Commission on Teacher Credentialing, Press Release April 15, 2011, Teacher Supply Continues to Plummet.*

The unmet demand for secondary mathematics and science teachers and elementary teachers with the content knowledge necessary to teach to California state content standards, particularly in low-performing urban schools and in rural areas, is well documented. According to a report released in March 2007 by the California Council on Science and Technology and the Center for the Future of Teaching and Learning, California continues to face a serious shortage of fully prepared science and mathematics teachers. In fact, the report concludes that current efforts will be unable to meet the demand for trained teachers and will need significant improvement to be successful.[17]

According to the report, "nearly 40,000 teachers taught at least one science or mathematics class in 2005-06, representing over 13% of the state's teacher workforce…at least 12% of these teachers lack suitable training to effectively teach their subject, and as many as 35% of first and second year science teachers and 40% of first and second year mathematics teachers is under-prepared." The Center for the Future of Teaching and Learning has documented the disproportionate impact of under-prepared teachers on students in schools with high concentrations of poor and minority students and second language learners. These students are more likely to have an under-prepared teacher not "just once but several times in their school career."[18]

The Education Trust reported in "Core Problems, Out-of-Field Teaching Persists in Key Academic Courses and High-Poverty Schools," that in high-poverty schools, two in five mathematics classes have teachers without a college major or certification in mathematics. Further, in schools with a greater share of African-American and Latino children, nearly one in three mathematics classes is taught by such a teacher.[19] They reported that the problem is most acute at the upper elementary and middle school grades.

Concern about the qualifications of the teaching workforce in California is not new. In 1998, similar concerns prompted the passage of Senate Bill 2042 (SB 2042). This legislation required new standards be put into place for subject matter knowledge, teacher preparation programs, and teacher induction programs, reflecting the state's focus on standards-based instruction.[20]

In 2006, legislative leaders in California responded to concerns about the teaching profession with several pieces of legislation designed to strengthen it. These include SB 1209 focused on streamlining entry into the teaching profession, SB 1133 providing funding for the lowest-performing 20 percent of schools, and SB 1614, which implements a data system to track the state's teacher workforce.[21]

In a recent move to address the need for more highly trained teachers in mathematics, the Commission on Teacher Credentialing (CTC) proposed in April 2011 to create the Mathematics Instructional Added Authorization (MIAA), which would require advanced preparation and field experience in both mathematics content and the pedagogy of mathematics above the requirements for a multiple subject teaching credential and revising and renaming the Specialist Instruction Credential in Mathematics to the Mathematics Instructional Leadership Specialist (MILS) Credential. In its Proposed Amendments and Additions to Title 5 of the California Code of Regulations Pertaining to the Mathematics Instructional

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17 *California Council on Science and Technology, Newsletter, CCST Report, Volume 12, Issue 1 (February 2007). See also Critical Path Analysis of California's Science and Mathematics Teacher Preparation System (March 2007), prepared by the California Council on Science and Technology and the Center for the Future of Teaching and Learning.*

18 *California's Teaching Force, Key Issues and Trends 2006, The Center for the Future of Teaching and Learning, research conducted by SRI International.*

19 *Ingersoll, Richard M., University of Pennsylvania (2008), Core Problems, Out-Of-Field Teaching Persists in Key Academic Courses and High-Poverty Schools, The Education Trust, Washington, DC www.edtrust.org and reported on 11/25/08 in http://www.teachermagazine.org/tm/articles/2008/11/25/mathteacherspoorschools_ap.html?print=1.*

20 *SB 2024 Legislation: Chapter 548, Statutes of 1998.*

21 *California's Teaching Force: Key Issues and Trends (2006), Fact Sheet 7, The Center for the Future of Teaching and Learning.*

Added Authorization and Leadership Specialist Credential, the MILS authorization "recognizes a higher level of specialized skills that will allow an individual to not only provide support to teachers, but also provide leadership at the K-12 level with respect to the teaching and learning of mathematics."

Professional Development in California

While recent legislative efforts have resulted in a steady decline of under-prepared teachers overall, the shortage of new, fully prepared science and mathematics teachers will be exacerbated in the next decade because of attrition and retirement of the existing teacher workforce.[22] In order to meet this demand, teacher recruitment, training and retention of teachers in these fields is critical. Professional development and support of teachers already in the field is an essential element of meeting the demand. Most recently, California's professional development efforts have included the Mathematics and Reading Professional Development Program, California Subject Matter Projects, and the CaMSP grant program, which is described in more detail later in this introduction.

In 2001, Assembly Bill 466 established the Mathematics and Reading Professional Development Program. Through a reimbursement program for districts, teachers participate in professional development in mathematics and reading/language arts. With the enactment of SB 472, this program has been extended to continue until July 1, 2012. Under SB 472, teachers are trained on the statewide academic content standards, curriculum frameworks, instructional strategies designed to help all pupils gain mastery of the California academic content standards with special emphasis on English language learners and pupils with exceptional needs, and related adopted or standards-aligned instructional materials. SB 472 is part of full flexibility under SBX 42.

State Board of Education (SBE)-approved providers, many of whom participate in the CaMSP partnerships, provide SB 472 training to high priority teachers including new teachers, teachers whose assignments have changed, those assigned to high-priority schools, and those who are assigned to schools that are under state sanctions. Training consists of an initial 40-hour training with 80 hours of follow-up to be completed within two years. Teachers may also receive a 40-hour training of effective strategies that support the teaching of English Learners (EL), which counts toward the follow-up hours. CaMSP training may now incorporate SB 472 training as part of its requirements for intensive professional development, allowing many teachers to benefit from both professional development programs in the state.

Administered by the University of California Office of the President (UCOP), California Subject Matter Projects (CSMP) consist of a network of nine projects, each of which is housed in sites on university campuses throughout California. The projects include Foreign Language, History-Social Science, International Studies, Mathematics, Physical Education-Health, Reading and Literature, Science, Writing, and Arts. The CSMP began in 1988 and provides content-focused professional development to teachers, encourages teacher leadership, and supports a discipline-specific network of teachers and university faculty.

The CSMP have evolved over time to respond to state policymakers and the needs of the teachers they serve including involvement in many CaMSP partnerships. In 1998, state legislation required that CSMP focus on teachers with the most needs including those in low-performing schools and those working with ELs. CSMP has also responded to NCLB by providing professional development to help teachers achieve "highly qualified" status and serve schools that have missed Adequate Yearly Progress (AYP) targets in the law. Since its inception, CSMP funding has fluctuated widely, more than doubling from $15 million to $35 million and then dropping to less than $10 million in federal and state funding combined in 2005-06. The California Mathematics Project and the California Science Project have received federal funding through participation in CaMSP grants.[23] In 2008-09, CSMP sites received funding of $7.8 million from federal and state sources, emphasizing goals of raising teacher content and pedagogical content

22 *Critical Path Analysis of California's Science and Mathematics Teacher Preparation System, California Council on Science and Technology and the Center for the Future of Teaching and Learning (March 2007).*

23 *Evaluation of the California Subject Matter Projects (CSMP) Final Report, prepared by SRI International (December 23, 2005).*

knowledge, teacher leadership, teacher learning communities, and strengthening partnerships with low performing schools.[24]

Another program to improve teaching and learning is administered by the California Postsecondary Education Commission (CPEC). Funded under NCLB Title II, Part A, the Improving Teacher Quality State Grants Program (ITQ) provides both formula and competitive grants to improve academic content knowledge and pedagogical skills in core subject areas. Grants are provided to institutions of higher education which partner with high-need LEAs.

An ITQ grant is a multi-year partnership between one or more institutions of higher education (colleges, universities) and one or more local education agencies (school districts, county education offices) in high-poverty areas. Funds are targeted to improve student achievement by improving the quality of instruction and increasing the professional attainment of school faculty and other staff. The primary goal of each grant is to increase K-12 teachers' pedagogical and academic content knowledge through a program of rigorous professional development. A secondary goal is to expand knowledge of successful professional development models and techniques through evaluation research and dissemination of findings. Focus on this goal has increased considerably since the transition from Eisenhower to ITQ.

Unlike the original Eisenhower grants, ITQ grants are open to all academic subject areas. Currently funded projects include mathematics, science, language arts, history/social science, and visual and performing arts, with several grants addressing multiple subjects. To date, the ITQ program administered by the Commission has made 45 awards (and 20 sub-awards) to local partnerships for a total of $44 million in federal funds. These projects have provided high-quality professional development to 10,735 teachers, impacting the education of almost 602,000 students in high-need California schools.[25]

The California Mathematics and Science Partnership (CaMSP)

In January 2002, the No Child Left Behind (NCLB) Act of 2001 became law. The Improving Teacher Quality grant programs (Title II) are an important component of NCLB legislation. These programs encourage scientifically-based professional development for teachers as a means for improving student academic performance.

Title II, Part B, of NCLB authorizes state education agencies to administer a statewide Mathematics and Science Partnership (MSP) competitive grant program. At the federal level, the funds appropriated to MSP were initially allocated to the National Science Foundation (NSF) with subsequent years allocated to the Department of Education. California has the largest allocation among all states.

The CaMSP program is intended to increase the academic achievement of students in mathematics (grades three through Algebra I) and science (grades three through eight) by enhancing the content knowledge and teaching skills of classroom teachers through professional learning activities.[26] As overall student achievement rises, CaMSP programs are expected to reduce achievement gaps in the mathematics and science performance of diverse student populations.

Partnerships developed between high-need Local Education Agencies (LEAs) and the mathematics, science, and engineering faculty of Institutions of Higher Education (IHEs) are core to the improvement efforts sought by the CaMSP program. County Offices of Education (COEs) and other organizations concerned about mathematics and science education may also participate in partnerships. Successful

24 *http://csmpx.ucop.edu/?id=resource&resID=544.*

25 *Information summarized from the CPEC Website: http://www.cpec.ca.gov/FederalPrograms/TeacherQuality.asp.*

26 *Expanded from grades four through eight for science and grades five through Algebra I after Cohort 4 in 2007.*

CaMSP programs are designed to serve as models that can be replicated in educational practice to improve the mathematics and science achievement of California students.

The Mathematics and Science Leadership Office (MSLO) of the California Department of Education (CDE) is responsible for administering the competitive grant program. Less than three percent of the state's allotment is expended for administration of the program. These funds support the external evaluation, application competition, and the Learning Network. At the end of an initial funding cycle, partnerships may submit a review of their progress toward program objectives and, if successful, receive additional funding. Partnerships are required to submit a Project Profile, Project Narrative and Local Evaluation Report directly to the federal government through its Annual Performance Reporting System (APR).

Table 1.1: Federal and State MSP Allocations

Fiscal Year	Federal Allocation	California's Allocation
FY 2002	$12.5 million	$0 (NSF)
FY 2003	$100.3 million	$13.9 million (Cohort 1)
FY 2004	$149.1 million	$20.6 million (Cohort 2)
FY 2005	$178.6 million	$24.5 million (Cohort 3)
FY 2006	$182.2 million	$25.1 million (Cohort 4)
FY 2007	$182.2 million	$23.6 million (Cohort 5 and Research)
FY 2008	$179.0 million	$21.9 million (Cohort 6)
FY 2009	$179.0 million	$20.0 million (Cohort 7)
FY 2010	*	$21.3 million (Cohort 8)

** FY 2010 Federal Allocation information not available for this report*

Purpose of the Program

The purpose of the CaMSP program is to improve the mathematics and science achievement of students by encouraging LEAs and IHEs to form eligible partnerships that:

- Support mathematics and science curricula that are aligned with the California academic content standards and that implement the kindergarten-through-grade-eight instructional materials adopted by the State Board of Education (SBE).
- Improve mathematics and science teaching by encouraging IHEs to assume greater responsibility for improving mathematics and science teacher education through a comprehensive system of teacher preparation that guides and advises mathematics and science teachers.
- Focus on the education of mathematics and science teachers as a career-long process that continuously stimulates teachers' intellectual growth and upgrades teachers' knowledge and skills.
- Bring mathematics and science teachers together with IHE faculty as well as scientists, mathematicians and engineers to mutually increase subject matter knowledge and improve instructional strategies.
- Make evidence-based contributions to the learning and teaching knowledge base to inform the understanding of how students effectively learn mathematics and science.

The CaMSP program seeks to improve student achievement in mathematics and science through a sharp focus on the following three interrelated issues within two targeted grade spans in mathematics (grades three through Algebra I) and science (grades three through eight):

- Ensure that all students have access to, are prepared for, and are encouraged to participate and succeed in challenging and advanced mathematics and science courses.
- Enhance the quality of the mathematics and science teacher workforce.
- Develop evidence-based outcomes that contribute to the understanding of how students effectively learn mathematics and science.

Key Features

CaMSP partnerships are focused on understanding baseline student achievement and teacher workforce data in order to document improvements in student achievement in mathematics and science over time. Each CaMSP partnership is required to address the following five key features:

1. ***Partnership-Driven:*** Programs are designed and implemented by partnerships that unite administrators, teachers and guidance counselors in participating LEA partner organizations and disciplinary faculty, education faculty and administrators in IHE partner organizations. Partnerships draw upon the expertise of all members to meet the purposes of this program. Scientists, mathematicians, engineers and individuals from other partner organizations, including COEs, may also play significant roles in program activities. Partners are deeply engaged in the effort at both the institutional and the individual levels and share goals, responsibilities and accountability for the program.

2. ***Teacher Quality:*** Programs enhance the quality and expertise of teachers who teach mathematics and science. Drawing upon the expertise of mathematics, science and engineering faculty in IHE partner organizations, teachers are engaged in high-quality professional development activities to develop strong mathematics and science content knowledge and related pedagogical strategies. Program activities ensure that educators develop the necessary knowledge and skills to teach challenging courses effectively using SBE-adopted standards and instructional materials. Partnerships also develop and implement innovative strategies that include increasing the diversity of the teacher workforce and encouraging young women and other underrepresented individuals to achieve in mathematics and science.

3. ***Challenging Courses and Curricula:*** Programs ensure that students are prepared for, have access to, and are encouraged to participate and succeed in challenging mathematics and science courses. Various approaches that integrate reasoning, problem solving, hands-on and procedural skills are applied. Evidence of high-quality professional development is demonstrated by the instruction of well-trained teachers whose students have access to high-level mathematics and science content. Classroom instruction at all grade levels incorporates appropriate levels of rigor and challenge building on skills from one level in preparation for the next.

4. ***Evidence-Based Design and Outcomes:*** Program design is informed by current research. Program outcomes should contribute to the knowledge base of teaching and learning. Through participation in the California and National MSP Learning Networks, programs will collectively contribute to the knowledge base on teaching and learning so that research findings and successful evidence-based strategies can be broadly disseminated to improve educational practice. Programs also link assessment (classroom, local, and state) and accountability measures to their design and outcomes.

5. ***Institutional Change and Sustainability:*** To ensure program sustainability, partner organizations leverage resources and design and implement new policies and practices leading to well-documented, inclusive and coordinated institutional change at both the IHE and the LEA level. IHE partner organizations commit to engaging mathematics, science or engineering faculty, or any combination thereof, in activities that strengthen their teaching practices and their roles in mathematics and science education, including teacher preparation and professional development. Partner organizations commit to providing environments for teachers, guidance counselors and administrators that support an evidence-based approach and in which exemplary contributions to mathematics and science learning and teaching are recognized and rewarded. Other partners commit to engaging mathematicians, scientists, engineers and other individuals in activities that strengthen their roles in mathematics and science education for the long term.

Professional Learning Opportunities

Currently funded partnerships must use funds to provide a minimum of 60 hours of intensive professional learning opportunities and a minimum of 24 hours of classroom follow-up per participant in the areas of mathematics or science.[27] Intensive hours may include summer institutes, weekday or weekend workshops, or both. It is expected that all facilitators of the professional learning activities will participate in both the intensive segment and the follow-up in teachers' classrooms. The planning and delivery of the professional learning opportunities is based on a local needs assessment and must include the participation of classroom teachers.

Professional learning opportunities must adhere to the following requirements:

a. Improve teachers' subject matter knowledge.
b. Relate directly to the curriculum and academic areas in which the teacher provides instruction.
c. Enhance the ability of the teacher to understand and use the challenging California academic content standards for mathematics and science.
d. Provide instruction and practice in the effective use of content-specific pedagogical strategies.
e. Provide instruction in the use of data and assessments to inform classroom practice.

Professional learning opportunities may include:

a. Opportunities for teachers to work collaboratively with experienced teachers, college faculty or business professionals.
b. Leadership development activities to identify, develop and employ exemplary mathematics and science teachers as professional development providers.
c. Professional learning activities that include additional activities such as curriculum alignment, distance learning and activities that instruct teachers in the appropriate use of technology in the classroom.

Funded CaMSP partnerships participate in a statewide Learning Network through which they are linked with other researchers and practitioners in the study and evaluation of educational innovations designed to improve student achievement in mathematics and science. The Learning Network contributes to the education community's capacity to engage in and understand large-scale innovation in education.

27 *Prior to July 2007, all grants provided 80 hours of intensive professional development, which included the initial funding year for Cohort 3 and 4, which was reduced to 60 hours in the second and third years of implementation for these cohorts.*

Partnership Requirements

CDE has awarded the MSP funds in separate cohorts of partnerships. Cohorts 1 and 2 concluded their activities in 2008. Cohort 3 concluded their activities in June 2009. Cohorts 4 through 6 continued to be active in the 2009-10 school year and are incorporated in the qualitative findings in this report. In addition, in June 2008, six partnerships from Cohorts 1 and 2 were awarded grants under the Research Cohort to continue to provide professional development to a new cohort of teachers with an extensive research model to study the effectiveness of professional development. CDE announced Cohort 7 partnerships in February 2010, and Cohort 8 partnerships in January 2011, which will be incorporated in subsequent reports.

In each cohort, partnerships apply and compete for funds based on a Request for Applications (RFA). The Requests for Application (RFAs) released by CDE have been changed and refined for each cohort of partnerships.

Partnerships applying for a CaMSP grant must include:

- A high-need LEA, and
- An engineering, mathematics, or science department of an Institution of Higher Education (IHE).

Defined by each state, the term “high-need LEA” in California refers to an LEA where at least 40 percent of the students it serves qualify for the National School Lunch Program (NSLP). Partnerships may also include:

- Additional LEAs, including COEs, public charter schools, public or private elementary schools or secondary schools, or a consortium of such schools;
- Another engineering, mathematics, science or teacher education department of an IHE;
- A business or industry organization;
- A non-profit or for-profit organization of demonstrated effectiveness in improving the quality of mathematics and science teachers;
- Public or private organizations, agencies and foundations; and
- Local parent organizations.

Beginning with Cohort 4, partnerships were no longer allowed to apply for both mathematics and science professional development, though the same LEA and school districts may participate in both a mathematics and a science partnership. In more recent cohorts, the CDE review and granting process has been revised to an initial funding cycle of 18 months and, if approved for continuation, funding is available for an additional two 12-month cycles, during which the same group of participating teachers are required to achieve 84 hours of CaMSP professional development (60 hours of intensive and 24 hours of classroom follow-up) in each funding cycle.

In accordance with NCLB Section 2201, the CaMSP program is governed by the Uniform Provisions Act and requires the equitable participation of teachers who teach in nonprofit private schools located in districts where grants are awarded. Prior to submitting a grant request, each LEA in the partnership must engage in timely and meaningful consultation with representatives of private schools regarding the needs of their teachers related to improving mathematics and science teaching.

All partner organizations share responsibility and accountability for the CaMSP program. Each partner organization is required to provide evidence of its commitment to undergo the coordinated institutional change necessary to sustain the partnership effort beyond the funding period. Community colleges are encouraged to participate in CaMSP because of the strong role they play in the preparation and professional development of a diverse mathematics and science teacher workforce.

Lead Partner and Leadership Team Membership

The Lead Partner in a CaMSP partnership must be a high-need LEA. The Lead Partner submits the partnership proposal and signs the grant award assurances to accept management and fiduciary responsibility for the partnership. A Leadership Team must be convened and meet regularly to oversee the development of the program and the administration of the CaMSP. The composition of the Leadership Team is to be representative of the entire partnership.

- The Leadership Team must include those individuals identified in the RFA as Principal Investigator and Co-Principal Investigator. Note that one of these individuals must be a mathematics, science or engineering faculty member from a partnership IHE, and the other must be a representative from the Lead LEA.
- The Leadership Team must also include a Program Director from the Lead Partner LEA who is responsible for the day-to-day management of the program.
- Each partner institution must be represented on the Leadership Team.
- The partnership's evaluator, although not considered a partner, should also be included on the Leadership Team.

Evaluation Methods

Using both qualitative and quantitative data collection methods, the statewide CaMSP evaluation focuses on the following research questions:

1. How have the partnerships ensured that all students have access to, are prepared for, and are encouraged to participate and succeed in challenging and advanced mathematics and science courses?
2. How have the partnerships enhanced the quality of the mathematics and science teacher workforce?
3. What evidence-based outcomes from the partnerships contribute to our understanding of how students effectively learn mathematics and science?

Data Collection

Each year, the PW evaluation collects information using the following data collection strategies: (1) partnership site visits and professional development observations, (2) a statewide survey of participating partners and teachers, and (3) teacher and student outcome information. In the sixth year of the evaluation, PW conducted telephone interviews of partnerships in Cohorts 4, 5 and Research and site visits of Cohort 6 partnerships. In addition, PW has designed a Web-based database for use as a central location to collect data and to provide technical assistance for local partnerships related to data collection and evaluation.

Annual site visit to a subset of partnerships: Each year, PW visits a subset of partnerships. Using structured site visit protocols and methodology, PW conducts interviews and focus groups of key stakeholders and observes professional development activities offered by the partnerships. PW collects data from multiple partners related to the five key features of the program: partnership-driven, teacher quality, challenging courses and curricula, evidence-based design and outcomes, and institutional change and sustainability. In addition, PW observes professional development offered to participants in each partnership that is visited. In previous years, PW has visited and observed each new cohort of partnerships that had received funding in that particular year. For this report, PW visited all partnerships in Cohort 6.

Partner and Teacher Surveys: PW administers a partner survey and a participating teacher survey each year. The partner survey focuses on the involvement and roles and responsibilities of the stakeholders or partners in each grant/partnership (including institutions of higher education and professional development providers). The participating teacher survey is administered each spring to every teacher participant in the grant who has participated in at least one hour of training. The survey asks teachers for their opinions about how CaMSP professional development has impacted their teaching practice. Survey results and frequencies for each cohort and overall are available at www.publicworksinc.org.

Table 1.2: 2009-10 Partner Survey Response Rates

Partner Survey (2009-10)	Administered	Responded	Response Rate
Cohort 4	116	89	77%
Cohort 5	84	63	75%
Cohort 6	93	69	74%
Cohort Research	38	28	74%
Overall	***331***	***249***	***75%***

Table 1.3: 2010-11 Partner Survey Response Rates

Partner Survey (2010-11)	Administered	Responded	Response Rate
Cohort 5	77	56	73%
Cohort 6	93	76	82%
Cohort 7	194	146	75%
Cohort Research	36	30	83%
Overall	***400***	***312***	***78%***

Table 1.4: 2009-10 Teacher Survey Response Rates

Teacher Survey (2009-10)	Administered	Responded	Response Rate
Cohort 4	479	368	77%
Cohort 5	491	421	86%
Cohort 6	944	749	79%
Cohort Research	236	202	86%
Overall	***2,150***	***1,740***	***81%***

Partnership Phone Interviews: Each year, PW conducts a telephone interview of all currently funded partnerships. This interview incorporates a structured interview protocol collecting information about the status of achieving partnership training targets and teacher retention, the professional development model and how it has changed, evidence of student and/or teacher outcomes, sustainability, institutionalization, lessons learned and future plans. All partners are encouraged to participate in the telephone interview conference call.

Teacher Database: In order to measure the outcomes of CaMSP on participating teachers and their students, PW has developed an extensive teacher database that collects both teacher demographic data and teacher participation/attendance data. PW uploads individualized teacher data from the Professional Assignment Information Form (PAIF) for all teachers at targeted grade levels in all schools included in the partnership (both participating and nonparticipating teachers). This confidential data provides PW with the necessary information to calculate a baseline level on indicators of teacher quality prior to participating in the grant and then each year thereafter. This data also allows for comparison of this information to nonparticipating teachers. PW has developed an online interface to this database and partnerships use this tool to provide information about teacher professional development attendance. Activities are labeled as either intensive or classroom follow-up and by clear descriptions such as "lesson study at Emerson School" or "one-day workshop for 7th grade science teachers," as well as start and end dates, funding cycle and funding level. A memorandum of understanding (MOU) with CDE and with participating districts that require it ensure teacher confidentiality.

Student Outcome Data and Study: From the teacher database, PW has created lists of both treatment (teachers completing 84 hours of training) and control teachers (a matched sample based on PAIF data of teachers not participating in the training) for each cohort. From these lists, CDE and districts provided both baseline and achievement data for students on the California Standards Test (CST) in mathematics and science. For this study, teachers are matched using similar teacher characteristics and similar prior achievement of their students. The student outcome results are reported in the Student Outcome Study section of the report and include results from Cohort 3, 4, 5, 6 and Research.

Organization of the Report

This evaluation report is divided into five sections and appendices.

Section 1: Introduction & Evaluation Methods: The first section of the report is an introduction to the CaMSP program and provides information about the California context for implementation, an overview of program requirements, and a detailed description of the evaluation design and methods.

Section 2: Evaluation Results Overview: This section of the report provides a summary of implementation findings across the five key features of CaMSP including Partnership Driven, Teacher Quality, Challenging Courses and Curricula, Evidence-based Design and Outcomes, and Institutional Change and Sustainability.

Section 3: Evaluation Spotlight on Institutional Change & Sustainability: This section provides analysis from the qualitative study through the lens of institutional change as a result of CaMSP partnerships among IHE partners and efforts to embed and ensure sustainability of professional development policies and systems in LEA partners.

Section 4: Results of the Statewide Student Outcome Study: This section includes findings from the statewide student outcome study for Cohorts 3, 4, 5, 6 and Research, which includes a comparison of treatment teachers to a matched comparison group of non-participating teachers and regression analysis results.

Section 5: Recommendations & Next Steps: This section concludes the report with recommendations based on the findings and provides a description of next steps in the evaluation.

Appendices: Cohort maps and tables.

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Section 2:

Evaluation Results Overview

Evaluation Results Overview

This section of the report incorporates findings from the telephone interviews, site visits, partner survey, and teacher survey and is a summary of implementation across the five key features of CaMSP. Each of the instruments used in the evaluation is available on the PW Web site at www.publicworkinc.org. The PW evaluation uses the following implementation rubric as its analysis framework for the five key features:

Key Features Rubric	Scale
Partnership-Driven: The partnership represents its target population of districts, teachers and institutions of higher education. All partners exhibit a high level of commitment to the partnership. The governance structures include both the trainers/IHE and the districts as equal partners in planning the curriculum and logistics. The target population of the grant is served. ***Teacher Quality:*** The partnership has created a cohort of teachers enrolled in all aspects of the professional development. They are on their way to meeting the target number of teachers involved and the hours required. The approach to professional development is tied to state standards and is focused on both improving the content knowledge and pedagogical approach of teachers. The professional development is research-based, high quality for both intensive training and follow-up components that include monitoring of implementation. ***Challenging Courses & Curricula:*** Professional development is aligned to standards and aimed at transforming and improving instruction. The project is creating new challenging courses, lessons and curricula for pre-service or existing teachers and/or students. New courses, curricula, expectations or experiences for students will result from the professional development that teachers receive in this grant. ***Institutional Change & Sustainability:*** The role of the IHE is clear and integral to the project. The IHE is involved in the planning, curriculum development and delivery. The education department and the discipline department (mathematics/science) are involved. Teachers can receive credit for their professional development. The institutions (IHE and Districts) are impacted by the project in terms of a tangible result. There are sustainable elements of the grant. ***Evidence-based Design and Outcomes:*** Partnership uses a research- or evidence-based model for professional development. The evaluation plan makes sense for the project. The design and measurement system will produce an impact on teacher and classroom quality. There is a cohort of teachers for which examining the impact on student outcomes makes sense. A pre/post assessment of teacher knowledge is conducted and local student assessment is conducted (above and beyond CSTs).	**High-level implementation** ↕ **No evidence of implementation**

About the Partnerships

Each CaMSP partnership is led by a Local Education Agency (LEA) that meets the state's requirement to have 40 percent or more of its student population qualifying for the National School Lunch Program (NSLP). The lead LEA serves as both the fiscal agent and partnership coordinator and is required to hire a full-time project director to manage the partnership, which must serve a minimum of 30 teachers recruited for the entire grant period (three-plus years).

Within the guidelines of CDE's Request for Applications (RFA), lead LEAs have formed partnerships with other districts and Institutions of Higher Education (IHEs) based on a variety of factors related to the local and regional context. Additional factors in forming partnerships included location, district size, current or historical partnerships with an IHE or professional development provider, or a regional approach to professional development.

Partnership Composition and Retention of the Teacher Cohort

CDE's RFA did not specify or limit the number of districts or IHE's that could be included in a partnership application. After selection of an eligible LEA to take the lead, partnerships had the option to structure the number of districts and teachers they wanted to serve based on the needs of the partnership and the professional development model they wanted to implement.

The overall intent of the grant is to focus on teachers from high-need districts, though districts not considered high-need may participate as partners. When they applied for funding, partnerships determined a reasonable number of teachers to participate in the professional development model given constraints, such as the pool of teachers available for the focus of the grant, competing professional development demands and the necessary number needed for sustainability and saturation.

Cohort 6 is the most recently funded set of partnerships included in this evaluation report. Table 2.1 identifies partnerships in this cohort by the lead LEA and provides information about their composition including content focus, number of participating districts, number of schools, grade levels served, target number of teachers, and the number of teachers that had reached the target number of 84 hours of professional development at the end of the first cycle of funding.

Appendix A provides maps of each cohort included in this evaluation report that display the distribution of partnerships throughout the state. Appendix B provides additional background information for Cohorts 3, 4, 5, 6, 7 and Research including the lead LEA, partnership name, focus area, number of districts served, the identified IHE partner, and involvement of other partners such as the California Subject Matter Project or County Office of Education.

Cohort 6 included a total of 13 partnerships, three of which focused on science and the remaining ten on mathematics. Only two partnerships in Cohort 6 served more than two districts with the vast majority (9 of 13) designed to serve teachers from a single district (Table 2.1). One partnership serving multiple districts (John Swett USD) included a K-12 district and a collaboration of feeder districts to a high school district in the same region. The Shasta County Office of Education partnership included eight districts of varying sizes to serve the largely rural county in northern California and builds off a countywide model for professional development in mathematics funded in Cohort 5.

A minimum cohort of 30 participants was specified in the RFAs for currently operating partnerships. This minimum of 30 participants was established in the Cohort 5 RFA. The teachers that achieved the minimum number of professional development hours are the cohort of teachers that continue into the second and third cycles of funding. As a benchmark for establishing the effectiveness of partnerships in recruiting and retaining a solid cohort of teachers, PW compared the original target number of teachers for Cohort 6 to the number of teachers who had attended 84 hours or more of professional development in the first funding cycle, which ended June 2010.

As indicated in Table 2.1, a total of 844 teachers were targeted for professional development in Cohort 6 — 662 in mathematics and 182 in science. At the conclusion of the first funding cycle in June 2010, Cohort 6 partnerships were just a few teachers short of meeting the original target—with a total of 834 teachers attending 84 hours or more of professional development. On balance, seven of the 13 Cohort 6 partnerships had more teachers than the original target completing the expected hours of professional development, two were at or just below the target number, and four had fallen short of their original target goal.

Table 2.1: Focus and Target Populations from Cohort 6 with 84 hours or more

Lead District	Content	# of Districts	# of Schools*	Grade Level Target	Target # of Teachers	Teachers with 84+ Hours
Antioch USD	Math	2	52	3-7	55	61
Central USD	Math	1	21	3- Algebra I	35	34
Coachella Valley USD	Math	1	23	3- Algebra I	60	68
Fairfield-Suisun USD	Math	1	34	3-7	40	40
Fresno USD	Math	1	110	3- Algebra I	100	75
John Swett USD	Math	7	53	3- Algebra I	100	125
Kings Canyon USD	Science	2	43	3-8	51	43
Los Angeles USD	Math	1	979	5-Algebra I	100	89
Ontario Montclair SD	Science	1	35	4-8	89	73
Salinas City ESD	Math	1	15	3-6	89	95
Shasta COE	Science	8	78	3-8	42	44
Upland USD	Math	1	18	4-Algebra I	53	55
Whittier City ESD	Math	1	14	3- Algebra I	30	32
Total Mathematics	*10*	*17*	*1,319*		*662*	*674*
Total Science	*3*	*11*	*156*		*182*	*160*
Total for Cohort 6	**13**	**28**	**1,475**		**844**	**834**

** Total number of schools in partnership, regardless of gradespan*
Source: Public Works CaMSP Database, June 2010

As each cohort of CaMSP is implemented, partnerships have continued to strengthen the cohort of teachers enrolled in professional development. More teachers continued to achieve the target hours for professional development and many teachers continued in the second and third cycles of training, though attrition of teachers emerged as a theme of serious concern to project directors in interviews and site visits. This issue was raised as a special concern during the Cohort 6 site visits as they concluded their first year of professional development and in telephone interviews as the other cohorts experienced or anticipated difficulties in maintaining the same cohort of teachers in the second and third funding cycles during the continued budget crisis in California.

Because of the minimal rate of attrition that is allowable under the guidelines of the grant, the most successful partnerships have incorporated creative and determined recruitment plans that go above and beyond the written commitment from participating teachers required in CDE's RFA. Partnerships over-recruited, offered incentives for participation, and strived to maintain interest by offering challenging professional development that meets teacher needs.

Logistical concerns were also addressed through slight modifications to the original models proposed after reflection on the success of the initial phases of implementation. Project directors often reported having to make adjustments to planned activities such as those that required time out of the classroom or substitutes by scheduling collaboration activities after school or during Saturday sessions. Feedback from teachers collected during the site visits generally indicates a high degree of responsiveness to their concerns that allows them to continue to participate. One partnership in Cohort 6 used both summer and winter breaks to schedule intensive professional development to provide more opportunities for interaction and feedback between teachers, IHE professor and coaches throughout the year.

The requirement by CDE for a full-time project director dedicated to the project has resulted in more cohesive support for participants during challenging budgetary times. Strong communication with partners and with individual teachers is a hallmark of a solid CaMSP partnership. For example, several project directors reported working with site and district administrators to minimize grade-level movement out of CaMSP-eligible grade levels so that participating teachers could continue to be included. In some cases where teachers had to be moved to non-CaMSP grade levels or were hired after the start of the grant, LEAs contributed the funding needed so that they could continue. Despite their efforts, partners noted that factors largely out of their control, such as grade-level movement, retirement, medical issues, pregnancy leave, and the like were the most significant factors in attrition, not individual teacher's enthusiasm for or interest in the program.

Table 2.2 provides information about the number of teachers meeting various thresholds of participation in professional development by cohort. Note that for this report, Cohort 4 would have completed all CaMSP training (252+ hours), Cohort 5 and Research would have completed the first two years of training (168+ hours), and Cohort 6 would have completed the first year of training (84+ hours). For example, at the conclusion of training for Cohort 4, 345 teachers had completed 252 or more hours of mathematics professional development, over half the original goal of 631 teachers. However, it is important to note that Cohort 4 served a total of 791 teachers, with a large group (123) completing between 168 to 251 hours of professional development.

Table 2.2: Total Number of Teachers Meeting the Required Hours- Cohorts 4, 5, 6 and Research

	Target # of Teachers	Under 84 Hours of Training	84-167 Hours	168-251 Hours	252+ Hours	Total Served
Mathematics						
Cohort 4	631	134	189	123	345	791
Cohort 5	262	44	46	195		285
Cohort 6	662	78	678			756
Cohort Research	175	9	30	159		198
Total Cohorts 4, 5, 6, and Research	***1,730***	***265***	***943***	***477***	***345***	***2,030***
Science						
Cohort 4	127	7	15	7	46	75
Cohort 5	272	37	29	278		344
Cohort 6	182	9	163			172
Cohort Research	90	315	37	50	9	411
Total Cohorts 4, 5, 6, and Research	***671***	***368***	***244***	***335***	***55***	***1,002***

Source: Public Works CaMSP Database, June 2010

Institutions of Higher Education (IHE) Partners

Partnerships are required to include a science or mathematics department partner from the IHE. Involvement of the IHE's education school or department is optional and varies from partnership to partnership. All partnerships have included at least one IHE as required by the CDE RFA. In most partnerships, the IHE was an equal partner in the planning and implementation of the CaMSP initiative in their region though this varied somewhat depending on the extent of prior experience working together and the leadership and capacity of district-level staff to make the most of the resources available through the IHE partner or partners.

Individual representatives of the IHE's involved in CaMSP have expressed a strong interest and commitment to the work of the partnerships. Feedback from teachers consistently indicates that they believe they have benefited from the inclusion of professors for their subject matter expertise, which added to the overall enthusiasm for participating in CaMSP.

As CaMSP has evolved, IHE involvement is strongest at the leadership level and in the design and delivery of the professional development model particularly during the summer. In lead LEAs with personnel who contribute their capacity and perspective related to the particular needs of their teachers, IHE staff involved in the partnerships have become more adaptable and amenable to tailoring the training and support that is designed for CaMSP. As the districts involved in CaMSP have become more experienced in partnering with IHEs, the capacity to lead, direct and refine the professional development model has improved. In many cases, districts have become more self-reliant in this process and are a stronger voice in the implementation of professional development that better aligns to district priorities—building on the strengths and resources that the IHE partner offers.

Many partnerships continue to benefit from the involvement of IHE partners in previous cohorts. In fact, several partnerships in Cohort 6 are building as a continuation of efforts established in previous cohorts and one of the Cohort 6 partnerships noted their work together under a California Postsecondary Education Commission (CPEC) Improving Teacher Quality (ITQ) grant as a key foundation for the success of their Cohort 6 endeavor. This previous involvement put them at an advantage in terms of incorporating lessons they had learned with maintaining teacher interest and commitment for three years, with the content included in the intensive training, and with approaches to follow-up models that work during the school year.

In all partnerships, professors served as trainers or instructors of professional development. The level of involvement in the overall model for professional development varied from partnership to partnership, though IHE professors and trainers are increasingly included in both the intensive training and working with teachers during the school year for additional intensive training. While some IHE professors are involved during the school year for the classroom follow-up component, most of the partnerships in Cohort 6 designed classroom follow-up that could be administered by district personnel, such as a coach or through meetings and collaborative time organized by the project director. Despite the increase in the use of lesson study as part of the classroom follow-up strategy, fewer partnerships in the more recently funded cohorts have involved IHE professors in the part of this strategy that occurs during the school year or during classroom time. Rather, IHE professors are utilized more as "on-call" during the school year rather than formally involved in management of the classroom follow-up components.

Several partnerships in Cohort 6 indicated the inclusion of specific professors from IHEs for their particular expertise, such as one who was added to the partnership to serve as a lesson study coach and in several others, where trainers were brought in to support an emphasis in the training on meeting the needs of ELs such as for their expertise with Guided Language Acquisition Design (GLAD), EL literacy, and the like.

Feedback from teachers suggests that the involvement of IHE faculty lent credibility to professional development activities in CaMSP providing teachers with readily accessible content experts. In most cases, IHE involvement was dependent on the development of individual relationships between professors and the County Office of Education (COE), district, or training providers involved in the partnerships rather than connections at an institutional level. In addition, teachers and professors were able to make individual connections through coaching relationships, email correspondence and the like. This was further supported by the long-term nature of the partnership and training. This access was valued highly both by professors and by participants.

Governance and Commitment

In almost all cases, a school district served as the lead LEA in the CaMSP partnerships. A few partnerships are led by a COE, where teachers from the programs they run must also be served (there is one of these type of partnerships in Cohort 6). In nearly all cases in Cohort 6, however, the lead LEA served as both the fiscal agent and the coordinator of a single-district partnership in a medium- or large-sized district, which tended to support and reflect highly engaged and effective partnering between the two primary partners (a lead LEA and an IHE). In several partnerships, COE involvement was to supplement the professional development training capacity of the IHE or for particular expertise and historical involvement with the LEA or LEAs.

All CaMSP partnerships are required to have a Leadership Team that meets regularly (at least quarterly). Leadership Teams are to provide a forum for planning and managing the direction of the partnership and for feedback from partners regarding process and implementation. Most partnerships have a smaller team in place that meets more frequently to help support the project director in managing the day-to-day activities of the partnership, CDE and federal reporting requirements, teacher recruitment, and logistics related to professional development activities.

All partnerships have at least one IHE involved in their partnership and a few have active involvement with local community colleges. The lead IHE in one Cohort 6 partnership is a community college. In some partnerships, outside professional development providers or other organizations loosely affiliated with an IHE served in a lead organizational role directing professional development activities, providing coaching and other follow-up support, and coordination with partner districts though this was more rare in Cohort 6 than in previous cohorts.

Representation on the Leadership Team varied but typically included IHE representatives, coaches, facilitators, trainers, district and COE administrators, and representative teachers. Continuing a trend observed in previous cohorts, very few partnerships in Cohort 6 reported the involvement of site administrators in the leadership or organization of the partnership. However, there was a concerted effort in at least three Cohort 6 partnerships to address how to raise awareness and involvement of site administrators in CaMSP including through district-led professional development for principals and alignment of district classroom walkthroughs with the goals of CaMSP training.

Despite the difficulties of involving site administrators in the planning and implementation of professional development activities, the stronger involvement of district personnel and district priorities (such as alignment of training to pacing guides and use of benchmark assessment data in collaborative planning sessions) has resulted in fewer teachers reporting a lack of alignment of the training to their day-to-day teaching requirements. With the higher profile of mathematics as a subject area of concern, however, science partnerships in Cohort 6 continued to have additional difficulty in making sure that district and school site policies were in alignment with the professional development goals.

Despite the challenges of the lack of site administrative support, many partnerships reported teacher leadership within their partnership as a strength emerging from implementation over time and several partnerships in Cohort 6 are addressing this specifically as a goal for professional development. Teachers from the cohorts have become involved in textbook adoption committees, presenting at subject matter conferences, sharing their work with site leadership and other teachers, and becoming lesson study facilitators and coaches. Partnerships with previous CaMSP or other professional development grants often note how coaches or others were identified for inclusion in current efforts.

For Cohort 6, seven of 13 partnerships reported the direct involvement of a California Subject Matter Project or IHE professors with a history of involvement in that initiative. Six of these partnerships were mathematics focused and one was science focused. In one case, in which the Subject Matter Project was housed in the school of education, there was less direct involvement in the university's mathematics department as the professors that designed and provided the training had been typically involved as a result of prior experience in the subject matter project or recruited specifically for their expertise in the subject matter of the training.

Four partnerships in Cohort 6 reported the involvement of other organizations in their professional development—one was a private sector employer involved in a mathematics partnership and another was the wide-scale recruitment of organizations to serve as sites for field trips and field studies for a science partnership, which included employers, educational organizations and relevant non-profits. Both of these partnerships reported the difficulty of involving these organizations in the initial implementation and the best way to align their resources to the needs of the teachers. As they plan for the second year of implementation, plans are underway to better integrate these partners in overall implementation and fulfillment of the promise these resources offer to teachers and students to add relevance and student engagement in the material. The other two partnerships involved outside organizations that provided specific models for professional development, one in mathematics and one in science.

Teacher Satisfaction with Professional Development

Each year, PW administers a survey to all teachers who had participated in at least one hour of professional development in all active partnerships. This section includes responses from teachers in Cohort 4, 5, 6 and Research, which were surveyed in Spring 2010. A complete set of frequencies for the current year and for previous years of the evaluation is available on the PW Web site at www.publicworksinc.org.

Quality of Professional Development

Teachers were asked how satisfied they were with the overall quality of professional development on a scale from 1 "not satisfied" to 4 "very satisfied" with the option of "don't know" (Table 2.3). A large percentage of teachers reported high satisfaction with the content of their professional development (87-96%) and the overall rating of the professional development (88-95%). Nearly all teachers also rated pedagogy or institutional methods covered (89-97%), focus on aligning teaching with the standards (85-90%), quality of coaching (80-87%), overall quality of school year activities (82-92%), and impact of training on their own teaching (84-91%) highly. Teacher satisfaction with the overall quality of summer activities was in the range of 78-92% for Cohorts 5, 6, and Research and 78% for Cohort 4 teachers.

Table 2.3: Satisfaction with Professional Development (% Very Satisfied and % Satisfied), Cohort 4, 5, 6 and Research

How satisfied have you been with the overall quality of professional development offered to date?	Cohort 4	Cohort 5	Cohort 6	Cohort Research	Overall
Content of professional development	87%	89%	92%	96%	*90%*
Pedagogy or instructional methods covered	89%	88%	91%	97%	*90%*
Focus on aligning teaching with the standards	86%	85%	86%	90%	*86%*
Focus on using state adopted textbooks	67%	69%	72%	73%	*71%*
Quality of trainers	86%	89%	88%	92%	*88%*
Quality of coaching	80%	85%	86%	87%	*84%*
Overall quality of summer activities	78%	88%	88%	92%	*87%*
Overall quality of school year activities	82%	87%	87%	92%	*86%*
Impact of training on my own teaching	86%	84%	90%	91%	*88%*
Overall rating of professional development	***88%***	***88%***	***92%***	***95%***	***90%***

Source: Public Works CaMSP Teacher Survey, Spring 2010

Teachers were also asked about how the training has helped them professionally (Table 2.4). Using a Likert scale ranging from 1 “not satisfied” to 4 “very satisfied” with the option of choosing “don’t know” and “not applicable,” almost all teachers reported satisfaction that the training increased their content knowledge (83-94%); provided teachers with instructional strategies, techniques, or pedagogical approaches (87-93%); and the training had convinced them of the importance of hands on learning (80-92%). Slightly smaller percentages of teachers responded were satisfied with the following: helped teachers align instruction to the standards (79-88%), helped teachers use state adopted textbooks effectively (67-68%), has taught teachers how to conduct a lesson study (60-70%), and helped teachers commit to teaching (69-75%). Very few teachers indicated that CaMSP had helped to provide credits to obtain a minor or major in mathematics or science, helped to attain NCLB compliance, or helped toward a masters degree.

Table 2.4: Satisfaction with Professional Development from Training (% Very Satisfied and % Satisfied), Cohort 4, 5, 6 and Research

	Cohort 4		Cohort 5		Cohort 6		Cohort Research		Overall	
To what extent did the training help you professionally?	% Satisfied	NA	% Satisfied	NA	% Satisfied	NA	% Satisfied	NA	% Satisfied	NA
Has increased my content knowledge	83%	6%	84%	1%	89%	1%	94%	1%	87%	2%
Has provided me with instructional strategies, techniques, or pedagogical approaches	88%	5%	87%	0%	90%	1%	93%	1%	89%	1%
Has helped me align instruction to the standards	79%	8%	79%	3%	81%	3%	88%	3%	81%	4%
Has helped me to use state approved texts effectively	67%	13%	67%	5%	68%	6%	78%	6%	68%	7%
Provided me with credits to obtain a minor or major in math or science	21%	69%	19%	67%	17%	71%	19%	72%	18%	70%
Has helped me to attain NCLB compliance	19%	72%	16%	69%	19%	69%	21%	69%	18%	70%
Has helped me toward my masters degree	10%	79%	10%	78%	9%	81%	8%	82%	10%	80%
Has helped me create my own portfolio	27%	64%	23%	63%	25%	65%	28%	64%	25%	64%
Has taught me how to conduct a lesson study	60%	28%	70%	14%	63%	23%	67%	24%	65%	22%
Has helped me commit to teaching	70%	22%	69%	16%	74%	17%	75%	17%	72%	18%
Has convinced me of the importance of hands-on learning	80%	11%	84%	4%	84%	4%	92%	3%	84%	5%

Source: Public Works CaMSP Teacher Survey, Spring 2010

Responding teachers also rated various types of professional development or resources for developing their knowledge of mathematics and science content on a scale from 1 “no help” to 4 “helped a lot,” with the option of also selecting “don’t know” or “not applicable” (Table 2.5). High percentages of teachers peer/team teaching (87-90%), professional development offered through CaMSP (76-84%), previous or current coach (75-88%), teachers own reading or research and their attendance at a previous professional development teachers (75-79%), and observing other classrooms (66-76%) as “helped” or “helped a lot.” Teachers in Cohort 5 had a higher percentage of teachers (81%) who found that their involvement in a lesson study to be helpful in developing their content knowledge than other cohorts (Table 2.5).

Table 2.5: Helpfulness of Training to Improve Content (% Helped a Lot and % Helped Some), Cohort 4, 5, 6 and Research

Based on your teaching experience, please rate the following types of professional development or resources in terms of developing your knowledge of mathematics/ science content	Cohort 4		Cohort 5		Cohort 6		Cohort Research		Overall	
	% Helpful	NA	% Helpful	NA	% Helpful	NA	% Helpful	NA	% Helpful	NA
Previous or current coach	76%	15%	77%	15%	75%	16%	88%	8%	62%	28%
One of my professors	60%	29%	67%	23%	62%	29%	57%	33%	38%	20%
My principal	40%	23%	35%	20%	38%	18%	42%	19%	38%	20%
My peers/team teaching	88%	4%	87%	2%	90%	3%	88%	3%	88%	3%
Observing other classrooms	72%	20%	76%	13%	67%	19%	66%	25%	70%	19%
Involvement in lesson study	64%	24%	81%	9%	70%	19%	71%	21%	72%	18%
Undergraduate degree	41%	42%	41%	39%	37%	45%	35%	48%	39%	43%
Teacher credential program	42%	40%	37%	38%	40%	41%	36%	45%	39%	41%
Masters degree	21%	67%	24%	62%	22%	67%	17%	73%	22%	67%
My own reading or research	79%	14%	76%	12%	76%	15%	75%	16%	76%	14%
Previous professional development attended	79%	13%	76%	11%	76%	15%	76%	12%	77%	12%
Professional development offered through CaMSP	76%	15%	77%	12%	81%	13%	84%	12%	79%	13%

Source: Public Works CaMSP Teacher Survey, Spring 2010

Impact of Training on Student Outcomes, Courses and Curricula

In general, CaMSP training has been focused on improving teacher content knowledge and instructional strategies without a specific emphasis or connection to new courses and curricula. Partnerships usually based the training model they implemented on the assumption that a more general approach to increasing the content knowledge of teachers and their ability to effectively use research-based pedagogical practices would translate into more opportunities for challenging courses and curricula for students.

Most partnerships emphasize improving the quality of teaching in order to increase the expectations and experiences for students in mathematics and science rather than through the development of specific courses or curricula. Professional development was aimed at teaching standards in a way that engaged students and transformed the culture of the classroom.

Table 2.6 provides results from the survey about how teachers view the professional development training in helping to improve student achievement in the following areas: the California Standards Tests (CST) mathematics and science, ability to take advanced mathematics/science courses in secondary school, students grades and interests in mathematics and science. Continuing to use the Likert scale (1 being "not helpful" and 4 "very helpful" with the choice of "don't know" and "not applicable"), large percentages of teachers from all cohorts agreed that the professional development training was "helpful" or "very helpful" to support student improvement on the CST in mathematics and science (83-90%) and slightly smaller percentages agreed that the professional development would be "helpful" or "very helpful" (61-72%) to support their students' ability to take advanced mathematics and science courses in secondary school.

Table 2.6: Satisfaction with Student Outcomes from Training (% Helped a Lot and % Helped Some), Cohort 4, 5, 6 and Research

To what extent do you think the training will help to improve student achievement in the following areas?	Cohort 4		Cohort 5		Cohort 6		Cohort Research		Overall	
	% Helpful	NA	% Helpful	NA	% Helpful	NA	% Helpful	NA	% Helpful	NA
CST math/science	85%	9%	83%	6%	88%	5%	90%	6%	86%	7%
The math section of the CAHSEE	44%	48%	24%	61%	33%	57%	38%	57%	34%	56%
Students' ability to take advanced math/science course in middle and high school	72%	18%	61%	26%	61%	29%	71%	24%	64%	25%
Students grades in math	80%	13%	53%	26%	79%	10%	84%	12%	73%	15%
Student interest in math	80%	13%	53%	26%	81%	10%	81%	13%	74%	15%
Student grades in science	33%	52%	61%	27%	34%	48%	47%	47%	42%	44%
Student interest in science	33%	52%	62%	27%	35%	49%	43%	48%	42%	44%

Source: Public Works CaMSP Teacher Survey, Spring 2010

CaMSP Evaluation Efforts

All partnerships were required to propose a research-based model of professional development with a local evaluation plan in their proposal. However, in the beginning of CaMSP there was no clear definition from the federal level of what “research-based” constituted and large variations in the research used to justify professional development strategies existed. As described in the federal legislation, partnerships were intended to be in-depth research studies that examined the teacher and student outcomes of professional development and developed evidence for effective professional development models. With each cohort, CDE has refined the requirements for the local evaluation plan in its RFA and worked with partnerships to more closely monitor local evaluations.

Local Evaluation

As required in the RFA, partnerships created a local evaluation plan as part of their proposals. With each RFA, CDE has made slight adjustments to the requirements in the local evaluation section. In general, CDE has required that the local evaluator pre- and post-test teachers to measure changes in content knowledge, establish a control group of teachers to compare results in the pre- and post-assessment, and include analysis of local periodic and state assessments. In addition, in more recent cohorts, partnerships have been required to analyze evidence of changes in classroom practice and to hire an evaluator who is external to the process (i.e., the evaluator cannot be involved in providing or planning professional development activities).

As in previous cohorts, there was wide variation in the methodology partnerships proposed to use in their evaluations as research models to be tested through implementation. Despite more clarity in how the requirement for local evaluation was intended to be implemented at the state and federal levels, current partnerships continued to struggle with developing solid local evaluation plans, finding appropriate personnel or consultants to carry them out, and collecting and evaluating the data.

In general, while there has been improvement, some evaluation plans and local evaluation efforts continue to be uneven and disconnected from the original local evaluation proposals. Because of the tightening requirements in the CDE RFA, the selection and maintenance of a control group of teachers and students has continued to be a particular challenge in recent cohorts. In some cases, this can be difficult to address because of the high proportion of teachers participating in CaMSP from a particular grade and the general lack of enthusiasm from teachers to participate as a control teacher. However, in many of the Cohort 6 partnerships, there was a more concerted effort on the part of both the partnership and the local evaluator to work together on the collection of survey and assessment data, the recruitment of control teachers, and in more regular reporting to the partnership leadership and teachers on evaluation results.

While there continue to be fewer assessments for science content knowledge for teachers, the use of the Mathematical Knowledge for Teaching (MKT) assessment (also known as the LMT or Learning Mathematics for Teaching project) is fairly widespread among currently operating partnerships. Several partnerships reported using the ATLAST science assessment and the assessment system from the University of Louisville, which includes both mathematics and science assessments and includes a secure system for scoring and reporting of the results to local partnerships.

Federal and State Evaluation Efforts

The statewide evaluation has been described to partnerships at the beginning of implementation. Partnerships were informed that they could utilize data collected at the state level to be disaggregated at the partnership level including the teacher survey data, teacher database and statewide student outcome data collected in their own local evaluation studies.

The federal and state emphasis on creating a control group matched to a treatment group (participating teachers who received 60 hours, formerly 80 hours, of intensive and 24 hours of classroom follow-up for a total of 84 hours of training) required the development of a Web-based teacher database of both demographic information and attendance data. PW now receives CST information directly from CDE and can upload individualized teacher data reported from the Personnel Assignment Information Form (PAIF) for all districts involved in CaMSP partnerships directly from CDE. This confidential data provide the statewide evaluation with the necessary information to compare participants to teachers from the targeted grade-levels in all of the participating schools and districts.

All partnerships provided data for the annual federal report (the APR due in November) and more partnerships have kept the statewide teacher database up-to-date for attendance. CDE now uses the PW database for confirmation of periodic reports regarding participation and funding. Over time, partnerships have learned the importance of the data and the use of the teacher database for information on their participants and the accuracy and timeliness of reporting has improved. In the past three years of the evaluation, PW has worked more closely with local evaluators to provide technical assistance and to make the data available from the database for their own efforts.

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Section 3:

Evaluation Spotlight on Institutional Change & Sustainability

Institutionalization & Sustainability

As originally conceived in NCLB's Improving Teacher Quality Act, close linkages between the elementary, secondary and postsecondary institutions involved in mathematics and science education was a central feature of the legislation that guided the US Department of Education's administration of the Mathematics and Science Partnerships (MSP) effort. While the legislation envisioned better institutional connections through partnerships, there was also an emphasis on the impact of building the individual capacity of those involved in the partnerships from mathematics, science or engineering faculty at the Institutions of Higher Education (IHEs) to teachers and administrators in partnering districts. Therefore, MSP and CaMSP in California envisioned collective responsibility from both organizations and individuals involved in the partnerships.

As put into operation in California, institutionalization change and sustainability is one of the five key features of CaMSP. This feature involves making the most of individual contributions to improving mathematics and science education and improving the capacity of partner organizations and institutions to work together in these endeavors for the short and long term. Institutional change and sustainability in CaMSP involves the following:

- Leveraging of resources by partner organizations.
- Design and implementation of new policies and practices that lead to well-documented, inclusive and coordinated institutional change at both IHE and LEA levels.
- Commitment to engaging mathematics, science or engineering faculty in activities that strengthen their teaching practices and roles in mathematics and science education including teacher preparation and professional development.
- Commitment of partner organizations to environments for teachers, guidance counselors and administrators that support an evidence-based approach in which exemplary contributions to mathematics and science learning and teaching are recognized and rewarded.
- Commitment of partners to engaging mathematicians, scientists, engineers and other individuals in activities that strengthen their roles in mathematics and science education for the long term.

Data collected through the statewide evaluation related to institutionalization and sustainability is highlighted in this section of the report and includes the telephone interviews of Cohorts 4, 5, 6, and Research conducted in Spring 2010; selected items and open-ended responses to the partner survey conducted in Fall 2009 and Fall 2010; site visits of Cohort 6 partnerships in Spring and Summer 2010; and a subset of "return" site visits to Cohort 4 partnerships as they concluded their activities in June 2010. The evaluation rubric for institutionalization and sustainability includes the following:

- The role of the IHE is clear and integral to the project.
- The IHE is involved in planning, curriculum development and delivery.
- The education department and the discipline department of the IHE (mathematics/ science) are involved.
- Teachers can receive credit for their professional development.
- The institutions (IHE and districts) are impacted by the project in terms of a tangible result.
- There are sustainable elements of the grant.

No Child Left Behind Act of 2001

Elementary & Secondary Education
Title II—Preparing, Training, and Recruiting High Quality Teachers and Principals
Part B — Mathematics and Science Partnerships

Sec. 2201. Purpose; Definitions.

(a) PURPOSE- The purpose of this part is to improve the academic achievement of students in the areas of mathematics and science by encouraging State educational agencies, institutions of higher education, local educational agencies, elementary schools, and secondary schools to participate in programs that —

(1) improve and upgrade the status and stature of mathematics and science teaching by encouraging institutions of higher education to assume greater responsibility for improving mathematics and science teacher education through the establishment of a comprehensive, integrated system of recruiting, training, and advising mathematics and science teachers;

(2) focus on the education of mathematics and science teachers as a career-long process that continuously stimulates teachers' intellectual growth and upgrades teachers' knowledge and skills;

(3) bring mathematics and science teachers in elementary schools and secondary schools together with scientists, mathematicians, and engineers to increase the subject matter knowledge of mathematics and science teachers and improve such teachers' teaching skills through the use of sophisticated laboratory equipment and work space, computing facilities, libraries, and other resources that institutions of higher education are better able to provide than the elementary schools and secondary schools;

(4) develop more rigorous mathematics and science curricula that are aligned with challenging State and local academic content standards and with the standards expected for postsecondary study in engineering, mathematics, and science; and

(5) improve and expand training of mathematics and science teachers, including training such teachers in the effective integration of technology into curricula and instruction.

Institutionalized Supports for Professional Development

New Policies and Practices

In contrast to the change in practice described by individual members of the IHE partners, changes in policy or at the program level continue to be difficult to identify in CaMSP implementation. In many partnerships, IHE involvement was primarily driven by a few newly recruited professors or those who already had extensive experience working with teachers through various grants to provide professional development. In several partnerships, IHE involvement was driven by experience with the California Subject Matter Projects (CSMP) located at different campuses in the state.

Because of the intense nature of the grant requirements to serve the same cohort of teachers over three years, most partnerships and their leadership teams were primarily focused on providing the highest quality professional development they could for that particular group of teachers rather than thinking more broadly about making connections between the different organizations, departments and institutions as a whole.

With a few exceptions, there was very little indication of an overall effort to connect CaMSP efforts to broader goals related to pre-service training and recruitment of undergraduates to become mathematics or science teachers. However, a few partnerships involved pre-service teachers in training and had undergraduate students in mathematics and science work with students in teachers' classrooms or as additional support during the summer training.

One example of programmatic change was found at an IHE that had developed an education minor with courses from the science and mathematics departments. Science courses in the minor included chemistry and the process of teaching and learning science. Improvement in courses for educators at another IHE included more content-orientation and awareness of the issues in elementary versus secondary education and adaptation of curriculum to include vertical learning for teachers across grade levels.

Acting as both lead LEA programmatically and as fiscal agent for the grant, districts are getting used to their role in building partnerships with individuals from IHE's and building capacity for managing high quality professional development, especially in medium-sized districts. However, the responsibilities of the grant have made it difficult for smaller, rural districts to partner with other districts or with county offices of education, which had been a more prevalent feature of earlier cohorts of CaMSP. Rural districts are particularly challenged by the rules for participation as there is greater movement in grade level assignments in tight budgets and there is a much smaller pool of teachers to draw from for CaMSP.

Despite the rules for implementation, there continues to be variation in implementation and different models for professional development that are being tested as part of CaMSP. Some partnerships are working towards establishing or revamping student assessment systems especially in single-district partnerships where there is a better alignment between district policies and practices and the professional development from CaMSP. However, the overall approach to student assessment is uneven across CaMSP.

As CaMSP has become more widespread and the rules of the grant better understood, the structure and personnel assigned to the classroom follow-up piece have become identified as more essential to successful implementation and classroom follow-up has generally improved. Partnerships are finding that adaptation to teacher needs is important but fidelity to follow-up models supports institutionalization of practices such as teacher collaborative planning, lesson design and review of assessment results to make instructional decisions.

The continued lack of involvement of site administrators in planning and execution of professional development is an area of concern for institutionalization of practices and the capacity of teachers to continue to bring the practices they are learning to their school sites and grade level teams. Without a specific mechanism for continuing what they have learned, teachers were concerned about how what they were learning could be shared more widely among their colleagues or for principals to look for it and support it.

The reported use of online resources in a variety of ways within partnerships has increased and was particularly prevalent during this time period of the evaluation. Online resources are used for communication among the cohort of teachers and partners and include access to lessons, revised pacing guides, assessment tools, coaching rubrics and observation tools and the like. These resources and links can be found at the PW CaMSP Web site: www.publicworksinc.org/camsps/index.html.

Leveraging of Resources by Partner Organizations

In general, CSMPs, California Postsecondary Education Commission Improving Teacher Quality (CPEC ITQ) grants and other IHE-led professional development exist in parallel with CaMSP but are not necessarily integrated in any formal way other than through individuals with experience in various initiatives. In partnerships that draw from the experience of a CSMP or a CPEC ITQ grant, CaMSP has allowed for deeper integration at the district level and has required partners to adapt to district needs to meet the recruiting and retention requirements of CaMSP.

Partners in all cohorts continue to report strong relationships between partners, with particular strength in the leadership team. Many have built on existing partnerships and the development of leaders from the group of participants (for example, to become coaches) and finding ways to leverage support from other district initiatives (for example, using CaMSP to develop approach to professional development for other content areas). Many partnerships are now "repeaters," meaning at least one partner has been involved in a previous CaMSP cohort, with several adapting a previous design to a different content area or different district or set of districts.

Teacher leaders have emerged in many partnerships and are being incorporated as facilitators of training on district decision-making committees, and as conference speakers. A few examples of leveraging the resources of partner organizations were reported during the evaluation site visits or telephone interviews. These include a community college that hosts an annual summer conference for IHE faculty to support K-12 science education (with college credit for the science educators involved in the conference). Another IHE reported finding private sector funding for a summer academy for incoming 9th graders to prepare for Algebra I. Participating students receive tutoring and other support during the school year and a guarantee of placement in the IHE if they continue to attend the program each summer.

Individual Partner Commitment to the Effort

Engaged IHE Faculty

IHE partners, professors and other faculty involved in CaMSP training reported that their involvement had provided a more direct connection to teachers' classrooms and the challenges they face today. This involvement helped them to adjust their practice in terms of what they now view as important to teach and how to teach it. Both education and discipline faculty reported this transformation of practice. Some professors in discipline departments had not previously had the opportunity to apply a particular model of professional development (such as lesson study) as extensively as required in CaMSP (currently 84 hours per funding cycle) providing for more in-depth involvement and understanding of issues of implementation in the reality of today's classrooms. Nearly all partnerships reported the active involvement of their IHE partners in both planning the content of intensive professional development activities and, in a few cases, leading the evaluation and research component.

Using an Evidence-Based Approach

As CDE has strengthened its oversight of the evaluation and continued to raise the visibility of the local evaluation component, CaMSP is beginning to have an impact through higher quality instrumentation, documentation, and involvement of the local evaluator in informing the leadership team. Despite these improvements, reporting and sharing of these results outside of the partnerships will be important to continued institutionalization and sharing of lessons learned.

Many leadership team partners reported that local evaluation results have helped sharpen the focus of professional development and identified areas of strength and needs. Data has helped in the selection and refinement of content areas for planned professional development activities and provided recommendations for adjustments in classroom coaching based on teacher feedback. Partners also reported that they have examined data such as benchmark assessments and CST data to help the partners to determine how to improve student outcomes through professional development. More partners also reported that local evaluators are more integrated in the professional development itself by structuring time to report on the evaluation during training activities and in using data collected through the evaluation in time reserved for feedback and reflection.

Examples of the Use of Evaluation in Partnership Activities

Use in designing and refining professional development:

- [Evaluation is] shared in teacher training, leadership meetings and in site principal meetings. (Cohort 5)
- Teacher surveys guide progress of Lesson Study and Case Discussions. (Cohort 5)
- Formative assessments use reflections to adjust lesson study processes. (Cohort 5)
- LMT teacher assessments and district student common assessments and CST data results, as shared with teachers, are helping inform our content and pedagogy foci and set short and long-term goals for the partnership. (Cohort 6)
- We have now incorporated online teacher surveys using Zoomerang to help evaluate partnership activities. The results also help us plan for professional development and content focus. (Cohort 6)
- [Our partner] has used [our professional development model] to create its own program for teacher professional development titled "the Institute on Science and Sustainability." (Cohort Research)

Use in classroom follow-up and collaboration:

- Online coaching logs are helping us monitor our progress with teachers, identify teacher and student needs as well as assess coach[ing] support…logs…provide: time spent, coaching activity, major topics of interest, and support focus. (Cohort 6)
- The Evaluator shares (formally) with the participating teachers the results of both the teacher and student assessment results for control and treatment. The coaches work with the teachers to evaluate the student data to improve instruction. The evaluator works directly with the project director and math coaches via coaches meetings and other opportunities to discuss student and teacher outcomes and results. The coaching and instructional team works together to meet the needs of the teachers based on classroom observations and LMT results. (Cohort Research)
- Teacher and student results are shared with staff and teachers. Classroom profiles are generated showing student progress toward meeting state standards. Evaluators regularly meet with project staff for planning and program improvement purposes. (Cohort Research)

Use of student and teacher assessment data:

- Teacher pre/post tests help determine content of intensive and follow-up. (Cohort 5)
- Student assessments results [are] analyzed [and] next steps determined during [the summer] Intensive. (Cohort 5)
- Results of teacher pre/post assessments [are] analyzed to identify areas of need to be addressed in intensive trainings [and] analysis of student performance on [the] CST also used to identify topics for intensive trainings. (Cohort 5)

Source: Public Works 2009 Partner Survey

Long-term Engagement

One area that was showing promise in the beginning of CaMSP was the implementation of strategies to serve rural teachers and countywide projects that supported teachers in districts without the capacity to provide the extensive professional development support required for CaMSP. These countywide or multi-district partnerships were often facilitated through the support of a county office of education with a close relationship to the IHE partner. However, small districts have had to drop out of these efforts because of reassignment of teachers to other grades and retirement, and not being able to replace teachers in the cohort once it is formed. With fewer of these kind of multi-district partnerships in more recent cohorts of CaMSP, the inclusion of rural districts is a concern identified by partners.

In terms of sustainability of the teachers' efforts, partnerships assumed that if they could get the teachers to participate and receive the professional development model they had designed, participating teachers would demonstrate increased content knowledge and, in turn, translate this into effective pedagogical practice. Many partnerships reported that a side benefit of requiring that teachers participate for three years has been the strong relationships and collaboration developed through lesson study teams, professional learning communities and coaching relationships. While many partnerships will not be able to sustain coaching positions without CaMSP grant funding, several reported that the changes in teacher practice and openness to collaboration will be the most sustainable aspect of the professional development.

In a few LEAs, there were such strong IHEs, training and partner organizations, there was a tendency to defer to these organizations and institutions for their expertise and leadership. This deference sometimes prevented LEA personnel from becoming as trained or knowledgeable as needed for sustainability. However, with a three-year time horizon for CaMSP funding, institutionalization at the district level is having a much greater chance of success.

Section 4:

Results of the Statewide Student Outcome Study

Student Outcome Study Overview

The objective of this student outcome study is to determine whether there is evidence that the California Mathematics and Science Partnership (CaMSP) program has helped California's 3rd through 8th grade science students and Algebra I mathematics students learn more mathematics and science, as measured by the California Standards Test (CST), compared to what they would have achieved had they not had the benefit of being taught by a teacher who has participated in the program.[1] This study is the fifth in a series and combines two separate analyses of student data of the teachers who participated in CaMSP: one that examines 2009 data from the 3rd through 6th cohorts of partnerships, plus the Research Cohort; and another that examines 2010 data from the 4th through 6th cohorts of partnerships, plus the Research Cohort.[2] Though there is substantial overlap of participating teachers from one school year to the next, the outcome analysis focuses on the students of participating teachers in a given school year.

In the analysis of the 2009 data, there was evidence of an association between participation in CaMSP and slight, though relatively higher, student achievement on California's standardized mathematics and science tests. More students who learned from mathematics-focused partnership teachers performed better on their mathematics tests in 2009 when compared to students who did not have partnership mathematics teachers. In particular, Algebra I students showed signs of heightened achievement. These results are similar to findings from the outcome study of the cohorts and partnerships in 2008. However, in the set of cohorts and partnerships included in the 2010 analysis, there were no statistically significant score differences between treatment and comparison groups—for both combined mathematics and Algebra I. Overall, students taught by teachers who participated in CaMSP training and coaching in 2010 did no better than their non-CaMSP peers though there is variation when data is examined at the individual partnership level—in both the 2009 and 2010 analyses.

There is also evidence that the science-focused partnerships impacted science learning at the 8th grade level, both in 2009 and 2010. Eighth grade science students who had partnership teachers performed better on average on the CST for science in 2009, when compared to students who were not taught by partnership teachers. In 2010, 8th grade students of treatment teachers also performed better, but only slightly.

As described in the previous sections of this report, research suggests that teachers need sustained professional development over a period of time to affect student achievement. CaMSP provided a minimum of 60 to 80 hours of intensive training to all of the participating teachers, depending on the cohort, and 24 hours of classroom follow-up. Although the hours of CaMSP professional development available to teachers varied depending on the start date for each cohort, all participants received substantial and sustained training in either mathematics or science during this time period. This professional development model was designed to increase student achievement and, indeed, the results of this analysis show that CaMSP is associated with somewhat higher test scores, at least in some cases.

In order to quantify mathematics and science achievement, this evaluation of CaMSP examined performance on the mathematics and science CSTs. These tests are designed to measure the extent to which students have learned the state standards in these academic areas. Of course, many factors can influence student performance on mathematics and science CSTs. Because CaMSP did not randomly assign students to partnership teachers, a quasi-experimental design was used for this evaluation. In 2009 and 2010, CaMSP served nearly 50,000 students. For each of these students, a "virtual twin" was selected from within the partnership student database. Virtual twins did not receive instruction from treatment teachers, but were matched to students who did receive instruction from treatment teachers. Students were matched in terms of ethnicity, language classification, prior CST scaled scores (2008 or

1 *Grades served vary by cohort and partnership but have been limited to grades 3 to 8 and Algebra I high school teachers.*

2 *2009 outcome data reflects testing from the spring of the 2008-09 school year and 2010 outcome data reflects testing from the spring of the 2009-10 school year. These test results become available in the fall after a given school year. Throughout this section of the report, both terms are used and are intended to reflect student learning for the entire school year as measured by the CST.*

2009 scores transformed into percentile ranks for growth analysis), participation in the National School Lunch Program (NSLP), special education designation, gifted and talented (GATE) designation and characteristics of their teachers. For the partnership-by-partnership analysis, virtual twins were matched by partnership as well.

The resulting matched longitudinal comparison was used to test whether “treatment” students who learned mathematics or science from participating partnership teachers fared better on CSTs than “comparison” students who attended classes taught by teachers who had not participated in CaMSP.

There are several ways to use the CSTs to assess academic achievement. Here, four different measures are examined, some of which are appropriate only for mathematics but not science:

1. ***2008-09 and 2009-10 mathematics and science proficiency levels.*** Each student who takes a CST test is graded on a scale from 150 to 600. The range of scores is then divided into five proficiency bands ranging from Far Below Basic to Below Basic to Basic to Proficient to Advanced. The mathematics test is administered to students in each grade every year. The science test, however, is given to only 5^{th} and 8^{th} grade students. Since state education policy emphasizes moving most students into the top two performance bands, this analysis reports the proportion of students who have reached this level of attainment. Students who score 350 or above on the mathematics or science CSTs are placed into one of these two bands—proficient and advanced, and labeled “performing at grade level.”
2. ***2008-09 and 2009-10 CST mathematics and science scaled scores.*** Moving from one proficiency band on a CST to the next can require a jump of 50 or more points. Reporting proficiency bands alone, therefore, can mask smaller score changes that may be significant. Rather than just reporting proficiency categories, this study also includes comparison of virtual twins in terms of differences in their scaled scores. For both mathematics and science, all possible tests and grades are grouped to create an average combined mathematics or combined science test score. This score provides a gross indication of general achievement and broad measures of the impact of CaMSP.
3. ***Gain in 2008-09 and 2009-10 combined mathematics percentile ranks.*** Because PW has mathematics CST score data for students in the 2007-08 through 2009-10 school years, this study was able to include a comparison of the virtual twins’ mathematics scores from year to year. However, science CSTs are administered only at two grade levels, which means participating students’ virtual twins cannot be matched on prior science test scores, nor is a report on year-to-year growth in science scores possible. It should be noted that the CST mathematics tests change every year. Each grade-level mathematics test differs from other grade level tests in content. Many 8^{th} graders take the Algebra I test, but some take general mathematics or another test. For these reasons, scores on these tests are not directly comparable from year to year. Someone who does well on the Algebra I CST, for example, may not do as well in the Geometry CST. However, year-to-year analysis was accomplished by converting scaled scores to percentile ranks for each student. Percentile ranks were calculated for the entire database by grade level. Then, percentile rank differences were calculated and tested for significance. Thus, if a student performed in the 30th percentile in grade six on the General Mathematics CST and the 45^{th} percentile in grade seven on the Algebra Readiness Mathematics CST, that student shows a gain in performance of 15%.[3]

3 *According to the California Department of Education: “The CSTs should never be used…to monitor the progress of cohorts of students as they move through the grades.” (California Department of Education. 2009. Student Reports: Interpreting 2009 STAR Program Test Results Information for School District and School Staff. (p 14.) http://www.cde.ca.gov/ta/tg/sr/resources.asp. Accessed March 3, 2010.) Strict cohort tracking—or growth analysis—is invalid for two reasons. First, CSTs test different content from year to year. Therefore, performance on one year’s test is an indicator of learning in that year alone. Second, test items are more difficult in successive years but are not scaled for difficulty. A score of 300, for example, on the 6^{th} grade test is not equivalent to a score of 300 on the 7^{th} grade test, since items are more difficult on the latter. Transforming scaled scores to standardized percentile ranks, however, provides a way to compare performance year-to-year.*

4. ***Algebra I CST performance in the years of participation in CaMSP (2008-09 & 2009-10).*** Because the CaMSP professional development for mathematics teachers primarily focuses on algebra and algebra-readiness skills and, because passing Algebra I is an important predictor of future academic success, this analysis singles out the Algebra I CST for special attention. It includes an investigation of both scaled scores and proficiency levels. If partnership teachers are particularly effective in preparing students for the Algebra I test, one of the major goals of CaMSP will have been achieved.

Using these four CST-based measures, this section includes two major analyses, each conducted separately for the 2009 set of partnerships and the 2010 set of partnerships: a pooled, statewide analysis of CaMSP impact and a partnership-by-partnership analysis.

Several findings emerged from these analyses. They are summarized here and described in more detail in the results section below.

- ***The pooled analysis for 2009 shows that overall, CaMSP positively influenced mathematics and science attainment in California in that year.*** However, the 2010 analysis did not show a statistically significant difference in mathematics performance between the students of treatment teachers and the students of comparison teachers in that year. Eighth graders taught by CaMSP teachers included in the 2010 science analysis only slightly outperformed their non-CaMSP counterparts.
- ***Pooled analyses also show that, in 2009, as in previous years, CaMSP was associated with higher performance on the Algebra I CST.*** However, in 2010, there was no evidence of a similar effect on Algebra I performance.
- ***For both the analysis of the data from partnerships in place in 2009 and those in 2010, the pooled analyses masked differences in performance at the partnership level.*** The partnership-by-partnership analysis revealed the diversity of mathematics and science achievement among partnerships and allowed a focus on partnerships that showed evidence of effectiveness in CST performance improvement. Some partnerships showed marked improvement, while others exhibited little difference between treatment and their comparison groups.

This section now goes on to discuss the methodological approach of this evaluation and the comparison group selection process. Next, the context and composition of the partnerships as they have grown and evolved over six implementation cycles and over seven cohorts is presented (Maps of the partnerships are included in the appendix.). The partnership and cohort description includes the quantitative variations among the cohorts and differences in partnership location and participation, as well as characteristics of teachers and students in the compiled databases. Next, this chapter presents the results of the mathematics and science analyses in 2009 and in 2010. Because Science CSTs are administered at the 5^{th} and 8^{th} grades only, analysis of science results is limited to comparing treatment and comparison students' 2009 and 2010 science CST scores, which are presented separately. Finally, this section provides a brief interpretation of the student achievement outcomes, along with a discussion of the insights they provide for further evaluation and implementation of CaMSP.

About the Evaluation Approach

There is a growing consensus among educational researchers and evaluators today that fair and valid assessment of school or program effectiveness should incorporate value-added analysis despite continued discussion about the methods and appropriate interpretation of value-added methodologies and approaches. The value-added approach addresses the concerns that since students can vary in many ways, including family background, educational opportunities and prior academic achievement, the fairest comparisons examine the marginal contribution that schools or programs add to a student's achievement, while taking the variety of student individual factors into consideration.

This study takes just such an approach: it seeks to isolate the effect of CaMSP by accounting for other influences on a student's academic performance. To do this, before comparison of 2008-09 and 2009-10 public school students in terms of their performance on CSTs, students were matched to one another in terms of their teachers, schools and districts, and whether the students have the same ethnic and language classification, the same GATE or special education designation, and the same poverty level (measured as eligibility for NSLP). In addition, each mathematics partnership student is matched to another student—a "twin"—who scored at the same proficiency level on the previous year's mathematics CST.

This approach adjusts for some of the attributes of students that may contribute to their academic performance, leaving the program of interest—CaMSP—as the remaining observed influence on student achievement that varies between treatment and comparison students. Though this approach mitigates some potential bias arising from student, teacher, school and district differences, it remains limited in that it "controls" only for observed and measured variations. A number of unobserved factors also might contribute to any given student's academic achievement. For example, a student may have family or health problems that affect performance. Likewise, a teacher from the same school as a comparison teacher may become ill or dissatisfied, or experience another problem that impacts his or her teaching that year. Such problems would mean that comparing some students to others, even if they all had scored the same on the previous year's test and matched each other on background characteristics, would result in biased estimates of effect. Since avoiding all unobserved bias is impossible absent a random controlled trial, results from this evaluation should be interpreted as correlational, rather than causal.

About the Selection of Comparison Observations

The matching process began with the selection of non-participating teachers who are similar to the teachers who participated in CaMSP during the particular year for which the data is analyzed. Exact teacher matches were sought in terms of: grade level, school, years teaching and credential level. For example, for every 8th grade teacher who experienced partnership professional development, another 8th grade teacher at the same school with the same number of years teaching experience and the same credential level was selected. If this exact match proved impossible, another 8th grade teacher with the same values on the other three dimensions (school, years teaching, credentials) was sought in the same school district or in the same partnership. If matching teachers could not be found in the same district or partnership, they were sought in other districts and partnerships, but always with the same cohort. No teachers from non-CaMSP districts were included. Every effort was made to include multiple comparison teachers for every treatment teacher.[4]

Once matching teachers were found, academic performance and demographic data were collected for students of both treatment and comparison teachers, producing a database of over 100,000 students for each school year. Students from the two groups were then matched using a procedure called "Coarsened Exact Matching," or CEM, which found an exact match—or twin—for each of the treatment students in terms of:[5]

- Ethnicity,
- Language classification,
- Poverty,
- Special Education designation,
- GATE designation and
- Prior achievement.

4 *A limitation of same-school matching of partnership and non-partnership teachers is that the activities of a treatment teacher may spillover in various ways to the practices of comparison teachers at the same school. Any spillover of this kind would tend to bias the results against treatment.*

5 *Iacus, Stefano M., Gary King and Giuseppe Porro. 2008. "Matching for Causal Inference Without Balance Checking." http://gking.harvard.edu/files/abs/cem-abs.shtml.*

Note that, in addition to the demographic characteristics, students were matched according to their prior year (2008 or 2009) mathematics CST performance level score. For partnership-by-partnership analysis, students were matched using demographic attributes, prior performance and partnership, such that a treatment and comparison group existed within each partnership with equal numbers of students in each group. For growth analysis, students were matched on prior year percentile rank, which was calculated within grade.

About the Context and Sample

Partnerships

By Spring 2010, at the time of data collection for this evaluation report, CaMSP had involved 88 different partnerships between local education agencies (LEAs) and Institutions of Higher Education (IHEs).[6] Of these partnerships, 54 were mathematics-focused, 21 focused on science, and another 13 provided both mathematics and science professional development.[7] As a consequence of the California Department of Education's funding cycles, partnerships were clustered into six cohorts of teachers (plus the Research Cohort), each of which began professional development activities at a different time.

This section of the report covers five cohorts that were active in either 2009, 2010 or both years, as described in detail below. These cohorts involved between six and nineteen LEAs each. The mathematics partnerships serve grade levels three through Algebra I, which is taught in both middle and high school. Science partnerships served the 3rd through the 8th grades.[8]

This report includes analysis of:

- The final cycle of data on Cohort 3 partnerships, which completed the last of their three cycles June 30, 2009.
- The last two cycles of Cohort 4 partnerships, which finished their second cycle on June 30, 2009, and their third and final cycle June 30, 2010.
- The first and second cycles of Cohort 5, which had completed one cycle by June 30, 2009, and the second cycle by June 30, 2010, with one to go.
- The first cycle of Cohort 6, which completed one cycle June 30, 2010, and had two remaining.
- The first two cycles of Cohort R (Research), which had completed one cycle by June 30, 2009, and the second cycle by June 30, 2010, and had one remaining.

Sample

For both the 2008-09 and 2009-10 school years, PW collected teacher rosters from all partnerships and matched teachers to California student data. After matching partnership treatment teachers to similar non-partnership comparison teachers (as described above), PW consolidated complete data on 120,535 mathematics students and 44,674 science students, taught by 1,055 mathematics and 539 science treatment teachers, and 1,826 mathematics and 422 science comparison teachers in 2008-09. In 2009-10, PW consolidated data for 116,291 mathematics students and 20,040 science students taught by 1,146 mathematics and 528 science treatment teachers, and 1,488 mathematics and 822 science

6 *The lead LEA in a few partnerships is a County Office of Education. In these cases, the COE is required to serve teachers from its own programs as well as teachers from partner LEAs.*

7 *Partnerships in Cohort 4 and after had to select mathematics or science and could not serve both content areas.*

8 *Prior to 2009, partnerships could only serve 5th grade through Algebra I for mathematics and 4th through 8th grade in science.*

comparison teachers. The numbers of students for each year, cohort and subject are displayed in Tables 4.1 and 4.2. Students are divided into two groups by treatment and comparison teacher. Tables 4.3 and 4.4 detail the numbers of teachers per cohort in each group.

Table 4.1: Complete Partnership Data, Number of Students 2008-09

	Group and Subject								
	Treatment			Comparison			Total		
Cohort	Math	Science	Total	Math	Science	Total	Math	Science	Total
3	14,206	3,259	17,465	17,497	2,852	20,349	31,703	6,111	37,814
4	22,595	405	23,000	27,753	314	28,067	50,348	719	51,067
5	6,958	21,436	28,394	13,921	6,597	20,518	20,879	28,033	48,912
R	6,807	4,304	11,111	10,798	5,507	16,305	17,605	9,811	27,416
Total	*50,566*	*29,404*	*79,970*	*69,969*	*15,270*	*85,239*	*120,535*	*44,674*	*165,209*

Table 4.2: Complete Partnership Data, Number of Students 2009-10

	Group and Subject								
	Treatment			Comparison			Total		
Cohort	Math	Science	Total	Math	Science	Total	Math	Science	Total
4	14,430	154	14,584	15,520	89	15,609	29,950	243	30,193
5	6,603	8,963	15,566	7,074	1,614	8,688	13,677	10,577	24,254
6	27,562	2,646	30,208	32,495	2,375	34,870	60,057	5,021	65,078
R	4,892	2,401	7,293	7,715	1,798	9,513	12,607	4,199	16,806
Total	*53,487*	*14,164*	*67,651*	*62,804*	*5,876*	*68,680*	*116,291*	*20,040*	*136,331*

Table 4.3: Complete Partnership Data, Numbers of Mathematics Treatment and Comparison Teachers with Matched Data 2008-09

Cohort	Treatment	Comparison
Cohort 3 Mathematics	223	404
Cohort 4 Mathematics	402	686
Cohort 5 Mathematics	241	416
Cohort Research Mathematics	189	320
Cohort 3 Science	99	94
Cohort 4 Science	37	36
Cohort 5 Science	307	222
Cohort Research Science	96	70

Table 4.4: Complete Partnership Data, Numbers of Mathematics Treatment and Comparison Teachers with Matched Data, 2009-10

Cohort	Treatment	Comparison
Cohort 3 Mathematics	210	292
Cohort 4 Mathematics	168	213
Cohort 5 Mathematics	636	783
Cohort Research Mathematics	132	200
Cohort 3 Science	32	28
Cohort 4 Science	278	594
Cohort 5 Science	161	144
Cohort Research Science	57	56

Mathematics Sample

All observations with missing CST performance data were removed from the database. For the longitudinal analysis, the cleaned 2008-09 database contained 108,542 students and the cleaned 2009-10 database contained 105,440 students, with data for two years of mathematics CSTs and data on SPED, GATE and NSLP. Cohort-by-cohort, the numbers of students in each group and school year are displayed in Tables 4.5 and 4.6. Demographic composition of the 2009 and 2010 mathematics samples are displayed in Tables 4.7 and 4.8. After virtual twins matching, the composition of the samples altered somewhat. Treatment and comparison groups, however, had similar distributions of attributes. These distributions are displayed in Tables 4.9 and 4.10.

Table 4.5: Mathematics Partnership Students, Complete CST Data 2008-09

Cohort	Treatment	Comparison	Total
3	12,752	15,588	28,340
4	20,379	25,120	45,499
5	6,131	12,590	18,721
R	6,117	9,865	15,982
Total	*45,378*	*63,163*	*108,542*

Table 4.6: Mathematics Partnership Students, Complete CST Data 2009-10

Cohort	Treatment	Comparison	Total
4	13,160	13,882	27,042
5	6,074	6,530	12,604
6	24,539	29,560	54,099
R	4,523	7,172	11,695
Total	*48,296*	*57,144*	*105,440*

Table 4.7: Demographic Profile of Cohorts 3-5 & R Mathematics Partnership Students (Before Virtual Twins Matching) 2008-09

	% Students (n=108,542)	
	Treatment (n=45,379)	Comparison (n=63,163)
Male	50	50
Female	50	50
Asian	11	8
Filipino	3	2
Hispanic	51	55
African American	6	6
White	28	27
English Only	52	50
Limited English Proficient	21	24
Special Education	6	6
Gifted and Talented (GATE)	13	12
National School Lunch Program (Poverty)	55	59

Table 4.8: Demographic Profile of Cohorts 4-6 & R Mathematics Partnership Students (Before Virtual Twins Matching) 2009-10

	% Students (n=105,440)	
	Treatment (n=48,296)	Comparison (n=57,144)
Male	50	50
Female	50	50
Asian	7	7
Filipino	3	2
Hispanic	57	62
African American	6	6
White	25	22
English Only	56	52
Limited English Proficient	20	23
Special Education	7	7
Gifted and Talented (GATE)	12	12
National School Lunch Program (Poverty)	58	63

Table 4.9: Demographic Profile of Cohort 3-5 & R Mathematics Partnership Students (After Virtual Twins Matching) 2008-09

	% Students* (n=87,732)
Male	50
Female	50
Asian	10
Filipino	3
Hispanic	52
English Only	53
Limited English Proficient	21
Special Education	6
Gifted and Talented (GATE)	12
National School Lunch Program (Poverty)	55

* *Both treatment and comparison groups are matched on the variables listed. Other demographic groups were either too small to match without reducing sample size or were correlated with other match variables; each group contains 43,866 students*

Table 4.10: Demographic Profile of Cohort 4-6 & R Mathematics Partnership Students (After Virtual Twins Matching) 2009-10

	% Students* (n=93,548)
Male	50
Female	50
Asian	7
Filipino	3
Hispanic	59
English Only	56
Limited English Proficient	21
Special Education	7
Gifted and Talented (GATE)	12
National School Lunch Program (Poverty)	59

* *Both treatment and comparison groups are matched on the variables listed. Other demographic groups were either too small to match without reducing sample size or were correlated with other match variables; each group contains 46,774 students*

CaMSP Effect on Student Mathematics Learning

Pooled CaMSP Mathematics Effect

CaMSP has affected thousands of students in the six years of its implementation in California. It is reasonable to ask whether the overall educational attainment of the California mathematics students who have been taught by participating teachers is higher compared to students who have not been taught by teachers who participated in the program. To explore overall mathematics achievement, PW conducted a pooled analysis that examined mathematics scores across all cohorts and partnerships that were being implemented in 2008-09, and another analysis for the cohorts and partnerships being implemented in the school year 2009-10. Science analyses were conducted separately for each school year and are reported at the end of this section.

Matching virtual twins on a series of categorical covariates meant that the empirical distributions of background variables for both groups were identical or nearly identical and therefore unrelated to the treatment variable (having a partnership teacher). Balancing the groups (treatment and comparison) in this way made further controlling for observed covariates unnecessary. Simple tests of difference were adequate to estimate causal effects (average effect of the treatment on the treated—ATT). We used Chi^2 and t-tests to examine differences in proficiency levels and differences in scaled scores, respectively, between the treatment and comparison groups.

However, we also wanted to know the magnitude of the impact CaMSP had on mathematics attainment. Was it more or less influential than a student's background and prior achievement? To answer these questions, when preliminary analysis indicated an effect, we used Ordinary Least Squares (OLS) regression to estimate the effect size and effect direction of the treatment, holding demographic and prior achievement variables constant at their means.

For each analysis, we conducted two regressions if applicable.[9] In the first, the dependent variable was the CST Mathematics scaled score of interest (either 2009 or 2010)—which represented different tests depending on the grade level of the student and was a measure of overall achievement of the treatment group. In the second regression, the dependent variable was more focused—Algebra I test scores. The independent variable of interest was an indicator of whether the student had a partnership-trained teacher. A complete model was run for each dependent variable. Regression models included:

- The group treatment indicator (partnership teacher vs. non-partnership matched teacher),
- The 2008 or 2009 CST mathematics score as a baseline,
- Ethnicity,
- Language classification,
- Poverty,
- Gifted and talented classification and
- Special education designation.

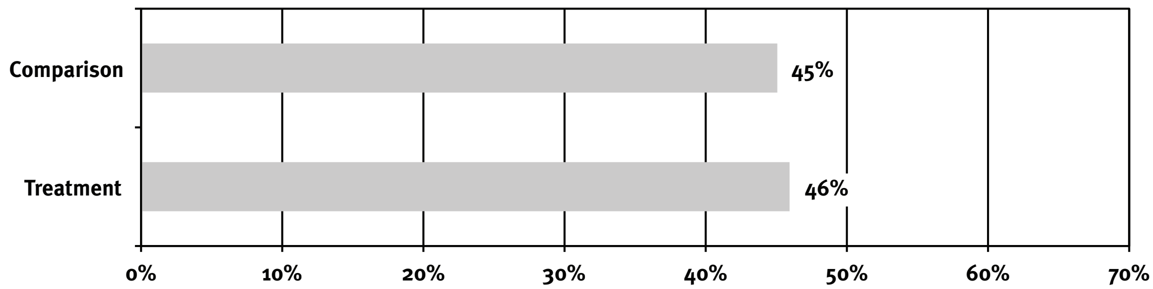
These variables are known to be associated with the outcome of interest: student performance on mathematics tests. Both regression procedures produced information about the overall significance of the models in accounting for variability in test scores, the amount of variability, and effect size of each of the predictor variables in the model. In order to compare effect sizes, fully standardized beta coefficients were calculated. Beta coefficients are useful measures of the relative impact of each independent variable on mathematics achievement.[10]

9 *Chi^2 goodness of fit tests allow testing for whether the observed proportions for a categorical variable differ from hypothesized, or expected, proportions. An independent samples t-test is used for comparing the means of a normally distributed interval dependent variable for two independent groups. Ordinary Least-Squares (OLS) regression is the most common form of linear regression. It allows examination of the linear relationship between one normally distributed interval predictor and one normally distributed interval outcome variable.*

10 *Long, S. J., and J. Freese. 2003. "Estimation Testing, Fit, and Interpretation." In Regression Models for Categorical Dependent Variables Using STATA. College Station, TX: Stata Press Publications.*

Results from the 2009 pooled analysis showed overall that treatment teachers had students who significantly more often (46%) performed at or above grade level (proficient and advanced) in mathematics when compared to the matched students of comparison teachers (45%, Figure 4.1). Looking more closely at test performance, the difference in mean 2009 Mathematics CST scaled scores between the two groups was statistically significant, with the treatment students performing better (350.63 v. 348.16, $p \leq .001$). But the difference between the two groups was very small – less than two scaled score points. This small difference in the pooled scores, however, masked larger differences apparent in individual cohorts and partnerships.

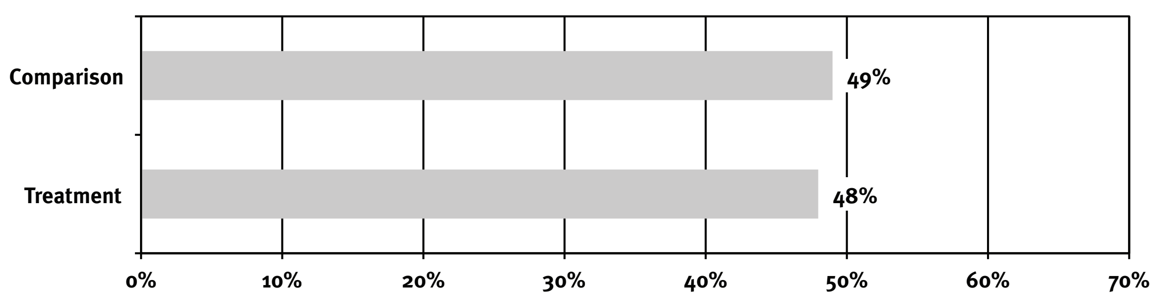
Figure 4.1: Pooled Sample, Matched Comparison to Treatment, Percent Proficient or Advanced CST Combined Mathematics, 2008-09



(Chi^2=19.26, d.f.=1, N=87,732, $p \leq .001$)

Pooled results for 2010, however, showed a different outcome. While the overall percentage of California school children who performed at or above grade level increased for both treatment and comparison groups, the comparison group did relatively better. The difference between treatment and comparison groups, however, was statistically indistinguishable (Figure 4.2).

Figure 4.2: Pooled Sample, Matched Comparison to Treatment, Percent Proficient or Advanced CST Combined Mathematics, 2009-10



(Chi^2=3.26, d.f.=1, N=93,548, p=.071)

Algebra I scaled scores are of special interest because CaMSP professional development curriculum focuses on strategies for teaching algebra skills more effectively. In order to explore algebra performance, it was important to match only students who took the Algebra I CST during the 2008-09 or the 2009-10 school years.

In 2009, a total of 18,208 students met this requirement. New virtual twins were identified, with 9,104 students in each group, treatment and comparison. The average score of the treatment twin was 337, whereas the comparison twin scored only 331 on average—a significant difference ($p \leq .001$, Table 4.12). In terms of proficiency bands, 39% of the treatment group achieved at grade level (proficient or advanced), whereas only 35% of the comparison students attained this level of performance (Figure 4.3).

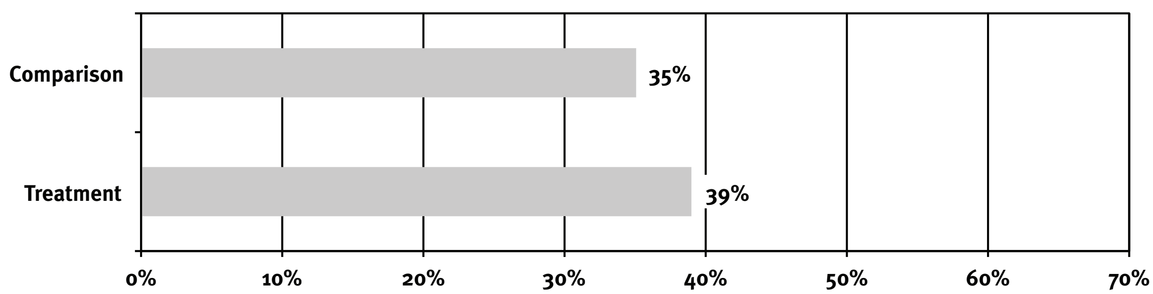
In 2010, virtual twins were matched with 7,996 in each group. The average scaled score of both treatment and comparison twins was 337 (Table 4.11). In terms of proficiency level, 39% of the comparison group and 38% of the treatment group scored at or above grade level—a statistically identical outcome (Figure 4.4).

Table 4.11: Pooled Sample, Matched Treatment to Comparison, Mean Scaled Scores CST Algebra I, 2008-09 and 2009-10

	Treatment		Comparison	
	N	Score	N	Score
Algebra I scaled score 2008-09	9,104	337.25*	9,104	331.45
Algebra I scaled score 2009-10	7,996	336.56	7,996	336.87

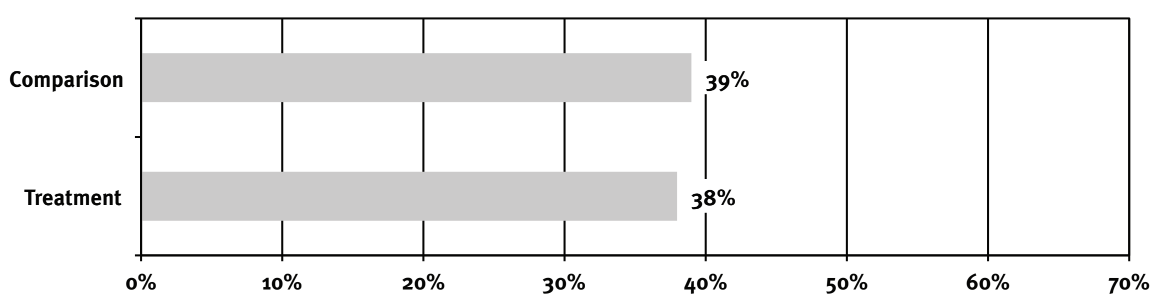
*$p \leq .001$

Figure 4.3: Pooled Sample, Matched Comparison to Treatment, Percent Proficient or Advanced CST Algebra I, 2008-09



(Chi^2=24.12, d.f.=1, n=18,208, $p \leq .001$)

Figure 4.4: Pooled Sample, Matched Comparison to Treatment, Percent Proficient or Advanced CST Algebra I, 2009-10



(Chi^2=.5832, d.f.=1, N=15,992, p=.445)

To investigate how treatment and comparison students made progress toward state goals of proficiency during the year they experienced a CaMSP teacher, PW conducted growth analyses, first examining the year-to-year difference in scaled scores. On average, the virtual twins from both groups did worse in 2009 than in 2008 in terms of scaled scores, which is not an uncommon outcome since the tests are more difficult from year to year. The students in the 2009 comparison group experienced a four-point decline (-4.38), whereas the 2009 treatment students decreased their performance by only two points (-2.13). The difference between the two groups was significant ($p \leq .001$, Table 4.12).

Table 4.12: Pooled Sample, Matched Treatment to Comparison, Mean Scaled Scores, CST Combined Mathematics, 2008-2009

	Treatment (n=43,866)	Comparison (n=43,866)
Mathematics scaled score 2008	352.76	352.54
Mathematics scaled score 2009	350.63*	348.16

*$p \leq .001$

2010 outcomes showed little difference between treatment and comparison groups. Both groups' scaled scores went down from year to year: the comparison group lost 2.03 scaled score points on average and the treatment group lost 2.44 points. The difference was statistically insignificant, as was the difference in 2010 scaled scores between groups (Table 4.13).

Table 4.13: Pooled Sample, Matched Treatment to Comparison, Mean Scaled Scores, CST Combined Mathematics, 2009-2010

	Treatment (n=46,774)	Comparison (n=46,774)
Combined Mathematics scaled score 2009	357.34	356.88
Combined Mathematics scaled score 2010	354.90	354.85

Because CST scaled scores are not scaled to be compared year-to-year, PW transformed the scores into percentile ranks for all of the students in the dataset, calculating ranks within grade levels.

In 2009, treatment students performed at the 51st percentile, moving up slightly from the 50th percentile in 2008. Comparison students, however, performed at the 48th percentile in both years, showing no appreciable growth. The gain of less than a full percentage point for the treatment students was small, but significant ($p \leq .001$).

In 2009 and 2010, matched treatment students performed on average at the 50th percentile, Matched comparison students in 2010 performed at the 48th percentile, which is also where they had placed the prior year. Thus, the 2010 students, whether in the treatment or control group, showed no gain from their achievement in 2009.

In order to determine the relative influence of various factors, including the treatment, on mathematics achievement in general (all grades, all tests), PW ran a complete regression for the 2009 pooled analysis, predicting combined mathematics tests scores. No regression was conducted for 2010 test scores because no significant differences existed in outcomes between treatment and comparison groups for that year.

Results in 2009 were that the treatment—and the model with additional variables added—was significant. However, the effect of being taught by partnership teachers was small. Prior achievement was the most important factor in the model (β=.71): for every additional increase by one standard deviation of a student's 2008 scaled score, his or her performance on the 2009 test can be expected to increase by 7/10^{ths} of a standard deviation, if all the other variables in the model are held constant at their means. The next most influential factors were Asian ethnicity and gifted and talented status, followed by white and Reclassified Fluent English Proficient (RFEP). Poverty, special education designation and African

American ethnicity were negative factors. The treatment—having a partnership teacher—exerted a slight, but significant positive effect (β=.02). All together, however, these factors accounted for 61% of the variability in CST mathematics scores (adjusted R^2 .61).

A regression using Algebra I scores in 2009 as the dependent variable, taking background and prior achievement factors into account, shows that CaMSP is more influential on Algebra I than it is on combined non-Algebra mathematics test scores. In this model, prior achievement on mathematics CSTs was still the strongest relative predictor of test scores, followed by Asian, GATE, RFEP and white. CaMSP was the factor with the sixth strongest relative impact on Algebra I scores (β=.04). In other words, in 2009, just as in 2008, CaMSP is associated with approximately four-tenths of a standard deviation increase in Algebra I CST scores.

In conclusion, the tests of differences and regression models indicate that CaMSP professional development played a significant and positive role in improving mathematics achievement across cohorts and partnerships in 2009—both in Algebra I proficiency and proficiency on grade-level mathematics CSTs. Although the effect size of the treatment is not large, more influential variables such as poverty, GATE status, or ethnicity are out of the schools' and teachers' domain of influence. It is also important to note that the small effect size in the pooled analysis may be a result of dramatic differences in the effectiveness of various partnerships in the program. Our next analysis explores partnership variability in detail.

CaMSP Mathematics Effect by Partnership

To explore how individual partnerships were associated with student achievement, PW analyzed CST scaled scores and year-to-year gain in CST percentile rank for each of the partnerships active in the 2008-09 school year and in the 2009-10 school year. These partnerships were grouped into five different cohorts, each with a specific start date and each lasting over three years and funding cycles. Rather than analyzing the partnerships in each cohort, this report separates the partnerships into three groups according to whether they were at the beginning of their three-year funding period, midway through their period, or had completed their training.

Beginning Partnerships

Ten beginning partnerships were included in the analysis. All of the beginning partnerships belonged to Cohort 6, which began professional development activities January 2009. By the end of data collection for this report in Spring 2010, these beginning partnerships had completed the first round of funding and one cycle of professional development (60 hours of intensive training and 24 hours of classroom follow up over 18 months). In this time, they produced one year of student test results.

PW analyzed two achievement measures for beginning partnerships. They were:

1) The CST combined mathematics (multiple tests) average scaled score for matched treatment students in each partnership compared to matched comparison (non-partnership teachers) students in the same year (2009-10).

2) CST combined mathematics (multiple tests) percentile rank gain, comparing how much matched treatment students improved in terms of their performance rank to how much matched comparison students improved in their rank from the year prior to treatment (2008-09) to the year of treatment (2009-10).

Four partnerships (lead LEAs: Antioch, Central, Fresno and Los Angeles) had average student CST scaled scores in 2009-10 that were significantly better compared to the 2009-10 scaled scores of their matched comparison students. Of these four partnerships, three showed significantly more percentile rank gain between 2008-09 and 2009-10 compared to their virtual twins. One partnership had significantly lower CST scaled scores measured up against its comparison group. This partnership's students also experienced less percentile rank growth relative to matched non-partnership students. Tables 4.14 and 4.15 provide details of these results.

Table 4.14: Beginning Partnerships, Matched Treatment vs. Comparison, CST Combined Mathematics Average Scaled Score, 2009-10 School Year

Lead LEA	Partnership Name	N	Treatment Scaled Score	Comparison Scaled Score	Difference
Antioch	Teaching the Essentials for Algebra Mastery (A-TEAM)	1,548	365	355	+10**
Central	Expert Teachers x Explicit Math Instruction = Exemplary Student Achievement (E2)	1,610	344	333	+11**
Coachella Valley	Success in Understanding Math (SUM)	2,053	343	344	-1
Fairfield-Suisun	Fairfield-Suisun Unified School District	1,275	358	357	+1
Fresno	Fresno Mathematics Academy	1,728	351	345	+6*
John Swett	North East Bay Mathematics Collaborative (NEBMC)	3,713	357	374	-17*
Los Angeles	Preparing for Success in Algebra	3,296	348	339	+9**
Salinas City	Salinas City Mathematics Partnership	1,502	354	356	+2
Upland	Project IMPACT (Increasing Mathematics Performance, Achievement, and Conceptual Thinking)	1,445	369	383	-14
Whittier City	Whittier City School District (WCSD)	750	358	355	+3

$*p<.05$, $**p\leq.001$

Table 4.15: Beginning Partnerships, Matched Treatment vs. Comparison, CST Combined Mathematics Percentile Rank Gain between the 2008-09 and 2009-10 School Years

Lead LEA	Partnership Name	N	Matched Treatment Percentile Rank 2008-09	Matched Treatment Percentile Rank 2009-10	Matched Treatment Percentile Rank Gain	Matched Comparison Percentile Rank 2008-09	Matched Comparison Percentile Rank 2009-10	Matched Comparison Percentile Rank Gain
Antioch	Teaching the Essentials for Algebra Mastery (A-TEAM)	1,345	46th	48th	2%*	46th	44th	-2%
Central	Expert Teachers x Explicit Math Instruction = Exemplary Student Achievement (E2)	1,486	51st	53	2%*	51st	47th	-4%
Coachella Valley	Success in Understanding Math (SUM)	1,932	44th	45th	1%	44th	45th	1%
Fairfield-Suisun	Fairfield-Suisun Unified School District	1,109	50th	49th	-1%	50th	48th	-2%
Fresno	Fresno Mathematics Academy	1,695	44th	43rd	-1%	44th	43rd	-1%
John Swett	North East Bay Mathematics Collaborative (NEBMC)	3,967	53rd	55th	2%*	53rd	57th	4%
Los Angeles	Preparing for Success in Algebra	3,142	45th	46th	1%*	45th	43rd	-2%
Salinas City	Salinas City Mathematics Partnership	1,339	42nd	42nd	0%	42nd	43rd	1%
Upland	Project IMPACT (Increasing Mathematics Performance, Achievement, & Conceptual Thinking)	1,370	61st	58th	-3%	61st	59th	-2%
Whittier City	Whittier City School District (WCSD)	726	46th	42nd	-4%	46th	44th	-2%

*$p \leq .001$

Midstream Partnerships

Ten partnerships had completed two cycles (120 hours of intensive training and 48 hours of classroom follow up) by the time that CST data was collected for this report in Spring 2010. These partnerships belonged to Cohort 5 and the Research Cohort, both of which began professional development activities in 2008 (Cohort 5 began in January and the Research Cohort began in June).

Since these midstream partnerships affected two cohorts of students, PW used two years of student test results (2008-09 and 2009-10) to compare midstream partnerships to their matched virtual twins. Thus, PW analyzed four achievement measures for midstream partnerships:

- The CST combined mathematics (multiple tests) average scaled score at the student level for matched treatment students in each partnership compared to matched comparison students in the same year—2008-09 (Table 4.16).
- The CST combined mathematics (multiple tests) average scaled score comparison for 2009-10 (Table 4.17).
- The CST combined mathematics (multiple tests) percentile rank gain, comparing how much matched treatment students improved in rank to how much matched comparison students improved in their rank from the year prior to treatment (2007-08) to the year of treatment (2008-09) (Table 4.18).

- The CST combined mathematics percentile rank gain from the first year of treatment (2008-09) to the second year of treatment (2009-10) (Table 4.19).

Two partnerships (lead LEAs: Shasta COE and Alameda COE) showed positive results on all four indicators: higher same-year CST scaled scores, comparing treatment to comparison students, in both 2009 and 2010; and higher two-year growth in average percentile rank between both 2007-08 and 2008-09 and between 2008-09 and 2009-10 (Tables 4.17-4.20). Another five partnerships in this category showed a mix of positive outcomes and non-significant outcomes. One partnership (lead LEA: Placer COE) appeared to improve from its first to its second cycle, performing less well on its 2009 CST scaled scores and 2008 to 2009 percentile rank growth when compared to its comparison group, but showing significant gain between 2009 and 2010. Two of these mid-stream partnerships had results that did not differ significantly from their comparison groups.

Table 4.16: Midstream Partnerships, Matched Treatment vs. Comparison, CST Combined Mathematics Average Scaled Score, 2008-09 School Year

Lead LEA	Partnership Name	N	Treatment Scaled Score	Comparison Scaled Score	Difference
Alameda COE	Strategic and Intensive Mathematics Initiative Phase 2 (SIMI-2)	537	369	354	+15*
Chico	Mathematics Professional Learning Community (MPLC)	682	358	362	-4
Del Norte	Wild Rivers Math Academy	626	354	343	+11*
El Rancho	Project Algebra Preparedness for High Achievement	1,819	333	332	+1
Placer COE	Rigorous Instruction in Mathematics Study (RIMS)	1,717	349	354	-5*
Red Bluff	North State Math Partnership	578	387	382	+5
San Francisco	Partners as Resources to Improve Mathematics Education (PRIME)	663	386	383	+3
Sanger	Central Valley Math Project	2,293	340	341	-1
Shasta COE	Shasta County Math Partnership (SCMP)	1,259	370	362	+8*
Washington	Washington Union California Mathematics and Science Partnership	114	340	331	+9

*$p \leq .05$

Table 4.17: Midstream Partnerships, Matched Treatment vs. Comparison, CST Combined Mathematics Average Scaled Score, 2009-10 School Year

Lead LEA	Partnership Name	N	Treatment Scaled Score	Comparison Scaled Score	Difference
Alameda COE	Strategic and Intensive Mathematics Initiative Phase 2 (SIMI-2)	490	380	373	+7**
Chico	Mathematics Professional Learning Community (MPLC)	524	355	354	+1
Del Norte	Wild Rivers Math Academy	738	357	364	-7
El Rancho	Project Algebra Preparedness for High Achievement	1,424	346	348	-2
Placer COE	Rigorous Instruction in Mathematics Study (RIMS)	1,370	353	354	-1
Red Bluff	North State Math Partnership	587	392	384	+8
San Francisco	Partners as Resources to Improve Mathematics Education (PRIME)	555	386	379	+7**
Sanger	Central Valley Math Project	1,663	356	354	+2
Shasta COE	Shasta County Math Partnership (SCMP)	1,169	387	380	+7*
Washington	Washington Union California Mathematics and Science Partnership	271	317	315	+2

*$p \leq .05$, **$p \leq .01$.

Table 4.18: Midstream Partnerships, Matched Treatment vs. Comparison, CST Combined Mathematics % Rank Gain Between 2007-08 and 2008-09 School Years

			Treatment Percentile Rank			Comparison Percentile Rank		
Lead LEA	Partnership Name	N	2007-08	2008-09	Gain	2007-08	2008-09	Gain
Alameda COE	Strategic and Intensive Mathematics Initiative Phase 2 (SIMI-2)	439	45th	47th	2%	45th	43rd	-2%*
Chico	Mathematics Professional Learning Community (MPLC)	629	45th	47th	2%	45th	47th	2%
Del Norte	Wild Rivers Math Academy	517	43rd	45th	2%	43rd	43rd	0
El Rancho	Project Algebra Preparedness for High Achievement	1,683	49th	50th	1%	49th	46th	-3%**
Placer COE	Rigorous Instruction in Mathematics Study (RIMS)	1,588	53rd	51st	-2%	53rd	54th	1%*
Red Bluff	North State Math Partnership	482	52nd	55th	3%	52nd	53rd	1%
San Francisco	Partners as Resources to Improve Mathematics Education (PRIME)	495	50th	51st	1%	50th	51st	1%
Sanger	Central Valley Math Project	2,082	48th	48th	0	48th	50th	2%*
Shasta COE	Shasta County Math Partnership (SCMP)	1,103	49th	50th	1%	49th	46th	-3%*
Washington	Washington Union California Mathematics and Science Partnership	70	32nd	35th	3%	32nd	34th	2%

*$p \leq .05$, **$p \leq .001$

Table 4.19: Midstream Partnerships, Matched Treatment vs. Comparison, CST Combined Mathematics % Rank Gain Between 2008-09 and 2009-10 School Years

			Treatment Percentile Rank			Comparison Percentile Rank		
Lead LEA	Partnership Name	N	2008-09	2009-10	Gain	2008-09	2009-10	Gain
Alameda COE	Strategic and Intensive Mathematics Initiative Phase 2 (SIMI-2)	404	45th	48th	3%	44th	44th	0%*
Chico	Mathematics Professional Learning Community (MPLC)	466	41st	42nd	1%	41st	42nd	1%
Del Norte	Wild Rivers Math Academy	650	45th	46th	1%	45th	48th	3%
El Rancho	Project Algebra Preparedness for High Achievement	1,379	44th	45th	1%	44th	45th	1%
Placer COE	Rigorous Instruction in Mathematics Study (RIMS)	1,261	55th	53rd	-2%	55th	51st	-4%*
Red Bluff	North State Math Partnership	529	56th	55th	-1%	56th	51st	-5%*
San Francisco	Partners as Resources to Improve Mathematics Education (PRIME)	461	46th	50th	4%	46th	47th	1%*
Sanger	Central Valley Math Project	1,584	53rd	52nd	-1%	53rd	52nd	-1%
Shasta COE	Shasta County Math Partnership (SCMP)	1,070	49th	51st	2%	49th	49th	0*
Washington	Washington Union California Mathematics and Science Partnership	237	32nd	38th	6%	32nd	35th	3%*

*$p \leq .05$

Complete Partnerships

Twenty-one partnerships had completed all three of their funding cycles by the time data was collected for this report. Each of these complete partnerships implemented 80 hours of intensive, plus 24 hours of classroom follow up professional development in their first year and 60 hours of intensive and 24 hours of classroom follow up professional development in their subsequent two cycles, resulting in a total of 272 hours of professional development for each complete partnership.

Eleven of the complete partnerships belonged to Cohort 3, which completed in June 2009. Ten were Cohort 4 partnerships, which completed their activities in June 2010. For the 11 Cohort 3 partnerships, this report includes analysis of two outcome measures: same-year comparative CST average scaled score in 2008-09 and final year percentile rank growth from 2007-08 to 2008-09. For the Cohort 4 partnerships, this report presents analysis of three outcome measures: same-year comparative CST average scaled score in 2008-09 and 2009-10, and final year percentile rank growth from 2008-09 to 2009-10. The results are presented in four tables, organized by year.

Table 4.20 shows CST average scaled score same-year comparisons for all 21 complete partnerships and their comparison groups in 2008-09. Table 4.21 is similar, but for 2009-10, and it includes only the eight partnerships from Cohort 4 that completed in 2010 and for which data was available.[11] Table 4.22 shows final year percentile rank gain from 2007-08 to 2008-09 and includes data from partnerships in Cohort 3 only because 2009 was the final year of activity for these partnerships. Table 4.23 shows final year percentile rank gain from 2008-09 to 2009-10 for Cohort 4 partnerships only, which had their final year of activity in 2010.

11 *Data was missing for two Cohort 4 partnerships in 2010. The lead LEAs for these partnerships were Sacramento and Ravenswood.*

Four of the 11 Cohort 3 partnerships (lead LEAs: Aromas/San Juan, Colusa COE, Healdsburg, Santa Maria-Bonita) showed positive and significant results for both measures reported: same-year CST scaled scores and percentile rank gain. One partnership showed negative results, and the remaining six showed no significant difference between treatment and comparison groups on any measure. Results are shown in Tables 4.20 and 4.22.

Of the complete Cohort 4 partnerships, only one showed positive results on more than two measures: Lincoln Achievement in Mathematics Partnership performed higher on average in terms of CST scaled score—treatment vs. comparison—in 2009 (Table 4.20). It also showed greater percentile rank growth in 2009 and in 2010 when treatment students were compared to matched comparison students within the partnership (Table 4.23). Another partnership (lead LEA: Santa Clara) showed higher relative percentile rank growth two years in a row—2009 and 2010. One partnership showed higher one-year outcomes in 2009 and one showed higher one-year outcomes in 2010. Three additional partnerships showed no significant results in 2009, but negative relative growth in percentile ranks in 2010. A final partnership had non-significant outcomes on all four measures (Tables 4.20, 4.21 and 4.23).

Table 4.20: Complete Partnerships, Matched Treatment vs. Comparison, CST Combined Mathematics Average Scaled Score, 2008-09 School Year

	Lead LEA	Partnership Name	N	Treatment Scaled Score	Comparison Scaled Score	Difference
Cohort 3 – Complete in 2009	Aromas/San Juan	San Benito County Science and Mathematics Academy for Rural Teachers (San Benito County SMART)	288	360	338	+22***
	Baldwin Park	Baldwin Park Math Science Partnership (BPMSP)	336	335	341	-5
	Colusa COE	Colusa County Mathematics Learning Community	129	337	324	+13*
	Fullerton	ExCEL: Exemplary Content Coaching to Enhance Learning	1,217	400	397	-3
	Healdsburg	R.A.A.F.A (Redwood Area Algebra for All)	1,186	345	334	+11***
	Lake Elsinore	Students Excelling in Systemic Math through Institutional Change	903	351	354	-3
	Monterey Peninsula	Monterey Bay Math Collaborative (MBMC)	634	331	328	+3
	Palm Springs	Mathematics Opens Doors (MOD)	414	359	365	-6
	San Leandro	Mathematics Support Initiative (MSI)	982	317	327	-10*
	Santa Maria-Bonita	Central Coast Mathematics and Science Partnership (CCMaSP)	590	347	334	+13***
	West Contra Costa	West Contra Costa Math & Science Partnership	1,232	300	301	-1
Cohort 4 – Complete in 2010	Alum Rock	South Bay Mathematics Collaborative	1,995	337	336	+1
	Imperial	Imperial County Mathematics Partnership	1,283	359	339	+30***
	Lincoln	Lincoln Achievement in Mathematics Partnership	699	364	354	+10**
	Little Lake	Achievement in Little Lake for Mathematics (ALL for Math)	268	362	361	+1
	Pajaro Valley	Pajaro Valley Unified School District Mathematics Partnership	352	325	326	-1
	Pasadena	Pasadena Math Pipeline	1,147	341	340	+1
	Ravenswood	Ravenswood Learning Collaborative for Student Achievement	249	393	407	-14
	Sacramento	Sacramento Algebra Collaborative	773	345	343	+2
	Santa Clara	English Language Development Institute for Algebra Readiness through the Support and Instruction of Educators (ELDI-ARISE)	1,665	358	355	+3
	Westminster	Developing Communities of Mathematical Inquiry (DCMI)	4,099	359	357	+2

*$p \leq .05$, **$p \leq .01$, ***$p \leq .001$.

Table 4.21: Complete Partnerships, Matched Treatment vs. Comparison, CST Combined Mathematics Average Scaled Score, 2009-10 School Year

Lead LEA	Partnership Name	N	Treatment Scaled Score	Comparison Scaled Score	Difference
Alum Rock	South Bay Mathematics Collaborative	1,360	336	338	-2
Imperial	Imperial County Mathematics Partnership	928	356	359	-3
Lincoln	Lincoln Achievement in Mathematics Partnership	767	352	349	3
Little Lake	Achievement in Little Lake for Mathematics (ALL for Math)	153	372*	395	-23*
Pajaro Valley	Pajaro Valley Unified School District Mathematics Partnership	729	335	331	4
Pasadena	Pasadena Math Pipeline	1,056	321	326	-5
Santa Clara	English Language Development Institute for Algebra Readiness through the Support and Instruction of Educators (ELDI-ARISE)	1,511	370	367	3
Westminster	Developing Communities of Mathematical Inquiry (DCMI)	1,743	372	372	0

a. All partnerships from Cohort 4, which completed in 2010
$*p \leq .05$

Table 4.22: Complete Partnerships, Matched Treatment vs. Comparison, CST Combined Mathematics % Rank Gain between 2007-08 and 2008-09 School Years

			Treatment Percentile Rank			Comparison Percentile Rank		
Lead LEA	Partnership Name	N	2007-08	2008-09	Gain	2007-08	2008-09	Gain
Aromas/San Juan	San Benito County SMART	242	50th	52nd	2%	47th	47th	0*
Baldwin Park	Baldwin Park MSP	293	43rd	44th	1%	45th	45th	0
Colusa COE	Colusa County Mathematics Learning Community	103	45th	55th	10%	45th	44th	-1%**
Fullerton	ExCEL: Exemplary Content Coaching to Enhance Learning	1,009	62nd	66th	4%	62nd	64th	2%*
Healdsburg	R.A.A.F.A (Redwood Area Algebra for All)	1,017	55th	58th	3%	55th	54th	-1%**
Lake Elsinore	Students Excelling in Systemic Math through Institutional Change	747	45th	51st	6%	45th	50th	5%
Monterey Peninsula	Monterey Bay Math Collaborative (MBMC)	475	45th	45th	0	45th	44th	-1%
Palm Springs	Mathematics Opens Doors (MOD)	326	42nd	44th	4%	42nd	45th	3%
San Leandro	Mathematics Support Initiative (MSI)	814	45th	43rd	-2%	45th	49th	5%**
Santa Maria-Bonita	Central Coast MSP	505	41st	48th	7%	41st	43rd	2%*
West Contra Costa	West Contra Costa MSP	1,112	41st	38th	-3	41st	38th	-3%

*$p \leq .05$, **$p \leq .001$.

Table 4.23: Complete Partnerships, Matched Treatment vs. Comparison, CST Combined Mathematics % Rank Gain Between 2008-09 and 2009-10 School Years

			Treatment Percentile Rank			Comparison Percentile Rank		
Lead LEA	Partnership Name	N	2008-09	2009-10	Gain	2008-09	2009-10	Gain
Alum Rock	South Bay Mathematics Collaborative	1,359	42nd	41st	-1%	42nd	46th	4%**
Imperial	Imperial County MP	878	48th	47th	-1%	48th	48th	0
Lincoln	Lincoln Achievement in Mathematics Partnership	708	52nd	54th	2%	52nd	50th	-2%**
Little Lake	Achievement in Little Lake for Mathematics (ALL for Math)	134	52nd	48th	-4%	51st	50th	-1%
Pajaro Valley	Pajaro Valley USD MP	685	43rd	45th	2%	43rd	43rd	0
Pasadena	Pasadena Math Pipeline	987	45th	38th	-7%	45th	45th	0**
Santa Clara	ELDI-ARISE	1,318	50th	51st	1%	50th	49th	-1%**
Westminster	Developing Communities of Mathematical Inquiry (DCMI)	1,639	57th	57th	0	57th	59th	2%*

*$p \leq .05$, **$p \leq .001$

Mathematics Partnership Summary

This partnership analysis includes up to two years of data for each partnership and was designed to shed light on some of the differences between partnerships that were at different stages of implementation. Beginning partnerships had just completed their first full cycle of professional development activities at the time of data collection for this report (Spring 2010). These ten partnerships – all part of the sixth cohort of CaMSP participants – showed some signs of success. After one-year and up to 84 hours of targeted professional development for each teacher, three of the ten (30%) produced better 2010 CST mathematics test gains compared to their matched comparison group. If more professional development results in greater test gains, it would be expected that midstream partnerships, which had provided teachers with 168 hours of learning support, would show evidence of increased success compared to first-year partnerships.

There were ten partnerships that were midstream—they had reached their second implementation year—in this analysis, which allowed exploration of both first and second year test results. As with the first-year partnerships, thirty percent of the midstream partnerships had produced higher first-year CST mathematics gains. But in their second year, 60% of this group had gains higher than their comparison groups. This finding supports the proposition that more hours of professional development may be associated with greater student achievement.

However, the evidence from the complete partnership analysis did not corroborate the proposition that a third year of professional development was likely to continue to result in even higher student outcomes. There were 21 partnerships that had completed three cycles – up to 272 hours of professional development. This analysis explored the second and final years of test score data for some of these partnerships (Cohort 4, ending in 2010) and only the final year of test score data for the rest (Cohort 3, ending in 2009). Overall, 33% of the partnerships experienced more test score gain in their final year compared to their matched comparison groups. However, this result masks the differences between cohorts. Forty-five percent of Cohort 3 partnerships showed more percentile rank gain than their comparison groups, whereas only 25% of Cohort 4 partnerships posted similar results.

Overall, this analysis shows some evidence of a positive trend related to CST improvement in partnerships with higher quantities of professional development primarily within the set of partnerships that were midstream in implementation. For the set of complete partnerships included in this analysis, the results were mixed, indicating perhaps that factors specific to individual partnerships probably played a greater role in student outcomes than hours of professional development alone.

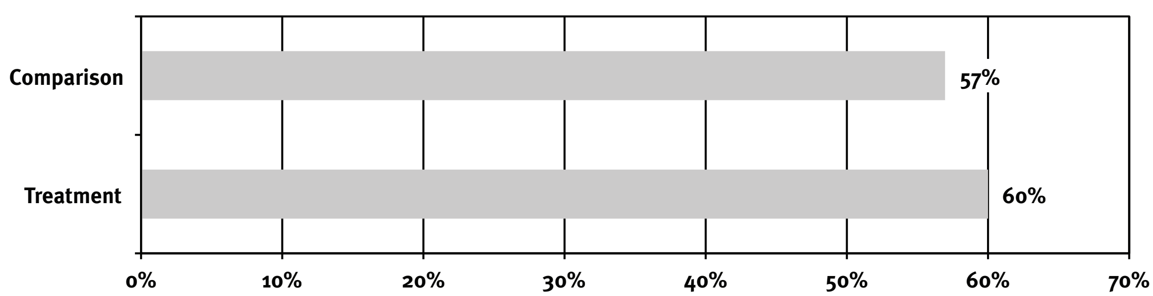
CaMSP Effect on Student Science Learning

Evaluation of the science partnerships followed a simpler procedure than the mathematics analyses. Because science standards tests are administered only in 5th and 8th grade, no year-to-year comparisons were possible. Nor was it possible to match virtual twins based on prior performance on a science test. Therefore, this analysis compares single-year scores (2009 and 2010), of students in treatment and comparison groups. The students in the two groups were matched on background variables, including prior mathematics CST proficiency levels, which were used as a proxy or general measure of prior academic achievement. Combined (two grades of science tests) results as well as results disaggregated by science test (either 5th or 8th grade science) are presented. This section includes both analysis of the pooled sample and partnership-by-partnership analyses.

Pooled Science Effect

The pooled analysis for all grade levels, all cohorts and all partnerships in 2009 showed a slight significant effect of CaMSP on combined 5th and 8th grade science scores. The comparison group had an average scaled score of 363. The treatment group's average score was 367. The difference between the two was significant ($p \leq .05$). Fifty-seven percent of the comparison students and 60 percent of the treatment students were at grade level or above—a significant result at the .05 level. Students who had taken science from a partnership teacher performed slightly better compared to those students who had not had a partnership-trained science teacher (Figure 4.5).

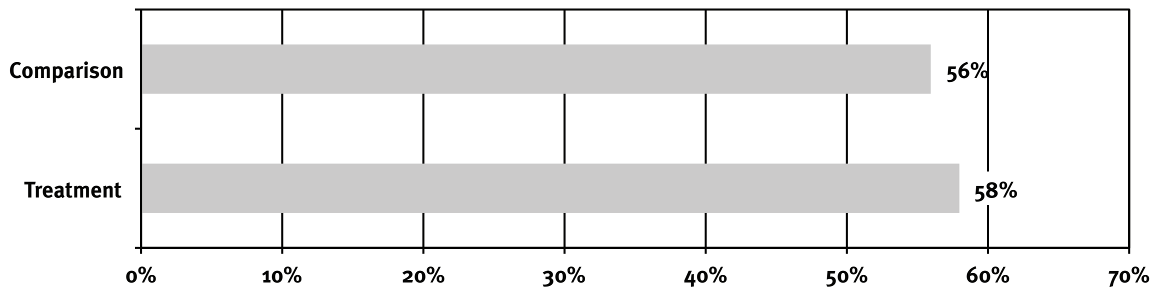
Figure 4.5: Pooled Sample, Matched Comparison to Treatment, Combined 5th and 8th Grade CST Science Proficiency Level, 2008-09



(Chi^2=4.936, d.f.=1, N=20,586, P≤.05)

The 2010 pooled analysis for grade levels, all cohorts and all partnerships also showed a slight significant effect of CaMSP on combined 5th and 8th grade science scores. The comparison group had an average scaled score of 368, compared to the treatment group's average score of 369, which was not a significant difference. However, a coarser comparison—the proportions of students at grade level (proficient and advanced) compared to students below grade level were 56% for comparison and 58% for treatment, and significant at the .10 level. Students who had taken science from a partnership teacher performed slightly better compared to those students who had not had a partnership-trained science teacher (Figure 4.6).

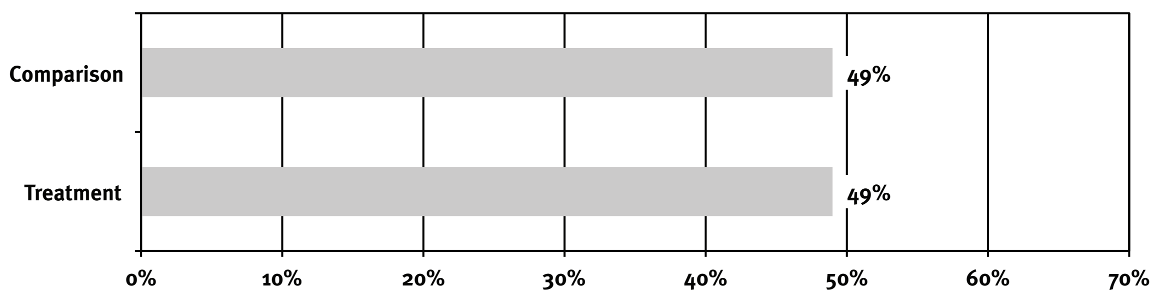
Figure 4.6: Pooled Sample, Matched Comparison to Treatment, Combined 5th and 8th Grade CST Science Proficiency Level, 2009-10



(Chi²=.3.3214, d.f=1, N=11,560, P≤ 0.1)

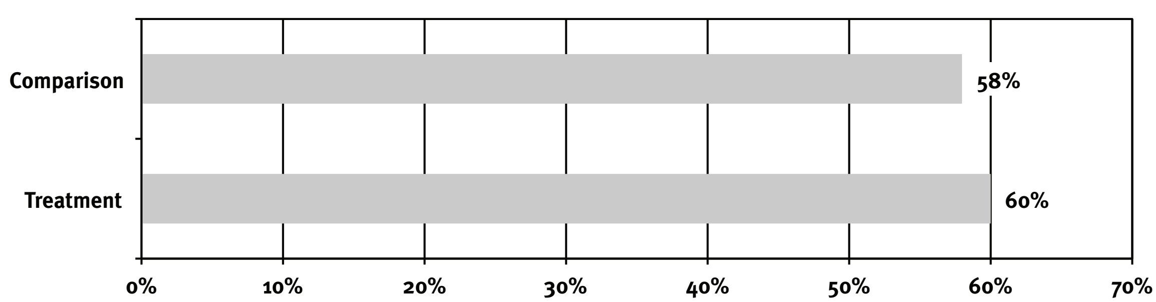
Comparison of grade level results in 2009 revealed that the significant pooled effect is attributable to 8th grade science performance. Treatment 5th graders performed no better than comparison 5th graders, but treatment 8th graders did perform significantly better than comparison 8th graders (Figures 4.7 and 4.8). Similarly, in 2010, comparison of grade level results revealed that treatment 5th graders performed no better than comparison 5th graders, but that treatment 8th graders did perform significantly better than comparison 8th graders (Figures 4.9 and 4.10).

Figure 4.7: Pooled Sample, Matched Comparison to Treatment, 5th Grade CST Science Proficiency Level, 2008-09



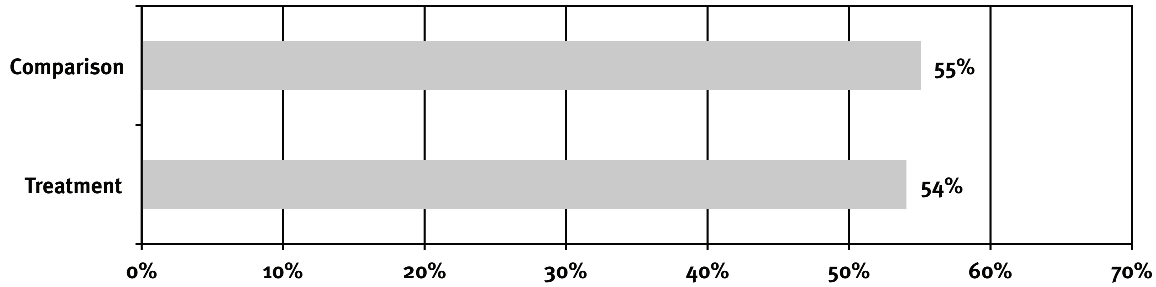
(Chi²=.0123, d.f.=1, N=5,314, P=.912)

Figure 4.8: Pooled Sample, Matched Comparison to Treatment, 8th Grade CST Science Proficiency Level, 2008-09



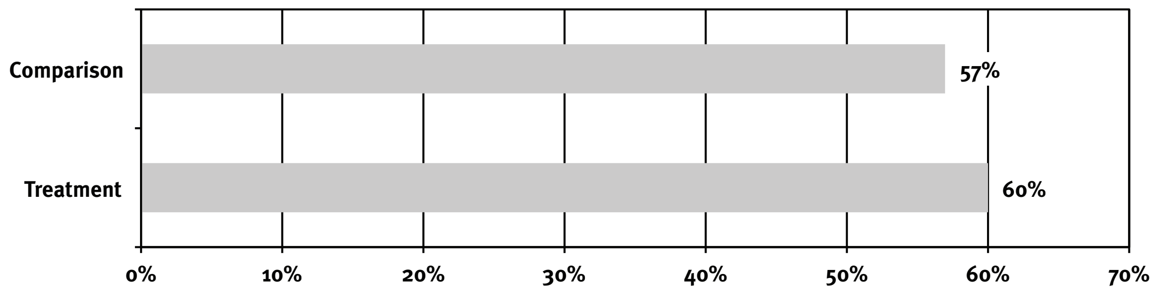
(Chi²=6.319, d.f.=1, N=15,272, P≤.05)

Figure 4.9: Pooled Sample, Matched Comparison to Treatment, 5th Grade CST Science Proficiency Level, 2009-10



(Chi^2=.1508, d.f.=1, N=3,232, P=.698)

Figure 4.10: Pooled Sample, Matched Comparison to Treatment, 8th Grade CST Science Proficiency Level, 2009-10



(Chi^2=.5.541, d.f.=1, N=8,192, $P \leq .05$)

Looking at scaled scores, in 2009, for 5th grade, no significant differences were apparent. Treatment 5th graders scored about the same as comparison 5th graders (353 vs. 352, not significant). However, 8th graders in the treatment group performed significantly better compared to 8th graders in the comparison group—371 and 367, respectively ($p \leq .05$). In 2010, no significant differences were apparent in scaled scores. Treatment 5th graders scored about the same as comparison 5th graders (357 vs. 358, not significant). Eighth graders in the treatment and comparison groups also were almost identical in terms of scaled score: 374 vs. 373.

Science Partnership Analysis

Analysis of science outcomes included three partnerships that had completed one funding cycle or beginning partnerships, six partnerships that were midway to completion after two full cycles, and eight complete partnerships that had finished all three cycles of funding. Beginning partnerships had data for 2010 only, whereas midstream and complete partnerships had data for both 2009 and 2010. All of the beginning partnerships served both 5th and 8th grade science teachers. Of the midstream partnerships, four served 5th grade teachers and three served 8th grade teachers. Of the complete partnerships, three served both grade levels, and the remaining five served 5th grade only.

Results are shown in Table 4.24. The table is divided into beginning, midstream and complete partnerships. Within each of these categories, partnerships are further divided and alphabetized by lead LEA within cohort. Complete partnerships completed activities in different years (2009 and 2010), which is indicated in the table. The table shows data only in the columns corresponding to the grade levels served by each partnership, which is an indicator of grade levels served.

Among the three beginning partnerships in 2009-10, none showed significantly positive results compared to their comparison groups, though both 5th and 8th grade results were slightly better for the treatment groups (with one exception). Of the six midstream science partnerships (four Cohort 5 and two Research Cohort), only one showed significant positive outcomes: Collaborative Success in Science (CS^2), lead LEA Lake Elsinore, was significantly higher compared to its comparison group for 5th grade science in 2009. However, the same partnership had significantly negative results in 8th grade science in 2009 and statistically identical results for both grade levels in 2010, suggesting that the partnership may have become less effective in its second year. None of the other five midstream partnerships had significant effects.

Eight complete science partnerships were analyzed. Six had one year of available data and two had two years of data. Three partnerships showed significantly higher science scores relative to their comparison groups in 2009 5th grade science. One had significantly lower results in 5th grade science in 2009, one had significantly lower results in 5th grade science in 2010, and no other partnerships had significant results for either grade either year.

Table 4.24: Science CST Scaled Scores, One-year Partnership Comparisons, 5th Grade, 2008-09 and 2009-10

				2008-09 5th Grade			2009-10 5th Grade	
Stage	**Lead LEA**	**Partnership Name**	**n**	**Treat.**	**Comp.**	**n**	**Treat.**	**Comp.**
Beginning	Kings Canyon	Kings Canyon Unified School District Science Project				145	360	349
	Ontario-Montclair	Partners for Outstanding Science Education (POSE)				430	342	341
	Shasta COE	Science Model Academy for Reflective Teaching: SMART Science				45	380	364
Midstream	Elk Grove	Excellence in Science Instruction	201	349	355	25	344	327
	Lake Elsinore	Collaborative for Success in Science (CS2)	186	386**	372	183	404	402
	Lynwood	Inquiry Based Science Readiness Academy & Sustainability Laboratory	390	320	318	212	333	340
	San Francisco	Working Together to Improve Science Education (WISE)	125	353	355	65	372	373
Complete (2009)	Aromas/San Juan	San Benito County Science and Mathematics Academy for Rural Teachers (San Benito County SMART)	72	319	354***			
	Baldwin Park	Baldwin Park Math Science Partnership (BPMSP)	112	356	352			
	Centralia	Collaboration for Success in Science Partnership (CSSP)	324	373**	363			
	Marysville Joint	Science Success for All	201	361***	338			
	Santa-Maria Bonita	Central Coast Mathematics and Science Partnership (CCMaSP)	97	328	318			
	West Contra Costa	West Contra Costa Math & Science Partnership	109	342**	329			
Complete (2010)	Carpinteria	Carpinteria & Santa Barbara School-Community Science Initiative	78	365	380	13	367	369
	Kelseyville	Learning Activities through Kelseyville's Exemplary Science Collaborative (LAKE Science Collaborative)	97	341	344	51	328	365**

*$p \le 0.1$, **$p \le 0.05$, *** $p \le 0.01$*

Table 4.25: Science CST Scaled Scores, One-year Partnership Comparisons, 8th Grade, 2008-09 and 2009-10

			2008-09 8th Grade			2009-10 8th Grade		
Stage	Lead LEA	Partnership Name	n	Treat.	Comp.	n	Treat.	Comp.
Beginning	Kings Canyon	Kings Canyon Unified School District Science Project				267	379	370
	Ontario Montclair	Partners for Outstanding Science Education (POSE)				530	347	348
	Shasta COE	Science Model Academy for Reflective Teaching: SMART Science				237	405	393
Midstream	Anaheim	Collaborating for Excellence in Middle School Science (CEMMS)	852	403	400	233	445	474***
	Lake Elsinore	Collaborative for Success in Science (CS2)	730	385	393**	683	391	405
	Los Angeles	Los Angeles Unified School District Program	2,410	332	332	1,495	339	339
Complete (2009)	Aromas/San Juan	San Benito County Science and Mathematics Academy for Rural Teachers (San Benito County SMART)	30	400	363			
	Baldwin Park	Baldwin Park Math Science Partnership (BPMSP)	122	336	342			
	Santa-Maria Bonita	Central Coast Mathematics and Science Partnership (CCMaSP)	247	342	340			

*$p \le 0.1$, **$p \le 0.05$, *** $p \le 0.01$*

Summary and Interpretation of Mathematics and Science Student Outcomes

The preceding analyses provide insights into the impact of CaMSP on mathematics and science achievement in California in 2009 and 2010. The examination of outcomes in 2009 showed positive effects. Same-year combined mathematics CST scores comparing the partnership treatment group to the matched comparison group showed positive effects both for all teachers and their students from all cohorts and partnerships pooled together, and for several individual partnerships in 2009. Year-to-year differences in combined mathematics CST scores corroborated the finding from the same-year scores analysis. An examination of Algebra I scores, comparing the treatment and comparison groups in the same year (2009) and exploring whether Algebra I performance improved compared to other tests taken the prior year (2008), showed that, overall, the pooled treatment group performed better on the Algebra I test. However, the investigation of 2010 outcomes, which consisted of a different set of cohorts and partnerships than those in 2009 did not produce similar results: the 2010 pooled treatment group, on average, performed no better than its comparison group.

There is also evidence that the science-focused partnerships impacted science learning at the 8^{th} grade level, both in 2009 and 2010. Eighth grade science students who had partnership teachers performed better on average on the CST for science in 2009, when compared to students who were not taught by partnership teachers. In 2010, 8^{th} grade students of treatment teachers also performed better, but only slightly.

The pooled analyses in both mathematics and science, however, masked differences in performance that were apparent when the data was examined at the partnership level. Examined individually, some partnerships showed positive, some neutral, and some negative outcomes. Because of the important role that the number of hours of professional development received by participating teachers plays in CaMSP implementation, this 2010 statewide report is the first of the CaMSP evaluation studies to explore how the stage of implementation may relate to in overall CaMSP outcomes. This analysis divided partnerships into three groups: beginning, midstream, and complete. The expectation was that beginning partnerships may show less substantial and significant outcomes, but that student performance could be expected to increase as the partnerships completed additional training and implementation developed and was refined over time. The exploratory analysis completed here provides a way to make coarse comparisons between the three groups.

For the beginning group of partnerships, about 40% showed some signs of positive effect, 10% showed a decline and 50% were not associated with an effect at all. The midstream partnerships looked considerably stronger. There were 10 partnerships in this group. Seventy percent had mixed (non-significant and positive) or consistently positive results, 20% had consistently non-significant results and one partnership improved from 2009 to 2010, initially appearing less effective relative to its comparison group, and then showing a higher score for the treatment group.

The complete partnerships present a more complicated picture. These partnerships were from Cohort 3, which completed in 2009, and Cohort 4, which completed in 2010. This report utilized one year of data for analysis of the 11 complete Cohort 3 partnerships and two years of data for the 8 complete Cohort 4 partnerships.

About 40% of the complete Cohort 3 partnerships with one year of data showed mixed positive results, about 10% showed negative results and over 50% did not produce significant results at all. Of the eight complete Cohort 4 partnerships with two years of data, about 40% were mixed positive non-significant, 40% mixed negative non-significant, 10% non-significant on every measure, and one partnership (roughly 10%) that improved from 2009 to 2010. Thus, results from the partnership analyses indicate that about a third of partnerships in any given year appear to be ahead of their comparison group regardless of stage of implementation. The analyses also indicate that partnerships that do well in the beginning often continue to do well. In fact, 60% of midstream partnerships (Cohort 5 and Cohort Research) had positive results in this study.

This exploration into the differences between and among partnerships that had just begun, were midway through, or had completed the implementation of their CaMSP grants suggests that details such as LEA context, professional development model, and partner commitment are likely more important than the stage of implementation or a threshold number of hours of professional development in measurement of student outcomes. Further study of these sets of partnerships, particularly within the newer cohorts will be explored in the next evaluation report, especially related to the implementation context in the concluding year of professional development.

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Section 5:

Recommendations & Next Steps

Summary

The statewide evaluation conducted by Public Works (PW) included data collected from the partner and teacher surveys, telephone interviews, site visits and an analysis of student outcomes. Instruments developed for the evaluation are organized using the following five key features of CaMSP implementation:

1) Partnership Driven
2) Teacher Quality
3) Challenging Courses and Curricula
4) Institutional Change and Sustainability
5) Evidence-based Design and Outcomes

Partnerships continue to build strong relationships between participating districts, IHEs, and other professional development providers. Partnerships currently emphasize the recruitment and maintenance of cohorts of teachers with the interest and dedication necessary to participate in the full three cycles of professional development. To maintain this cohort of teachers throughout the grant period, partnerships work hard to develop and maintain close ties between LEA partners and IHE partners. In addition, strong partnership directors were cited by leadership team members and teachers alike as being essential to successful implementation. The strong working relationships needed to meet the increased oversight of CDE related to teacher participation have helped districts, particularly mid-sized districts in single district partnerships, to build internal capacity for management of high quality professional development and better integration with district policies.

Despite the important progress being made with respect to developing capacity for implementation of professional development within high-need districts, the most recent cohorts are increasingly serving single-district partnerships and there is concern among partnerships serving small and very small districts to be able to effectively partner among themselves and administer all the requirements of a CaMSP grant. The most successful multi-district partnerships often include county offices as a partner or lead LEA or their personnel as professional development providers to pull these diverse districts together. As CDE's requirements for county office participation have been adjusted to require that at least 10% of participants in the grant be from the lead LEA, several partnerships have expressed concern with being able to continue to pull together districts with small numbers of teachers, especially when teachers have experienced great movement between school sites and grade levels in recent years.

The most consistent feedback that partnerships provide to PW, regardless of size and location, is the difficulty of keeping teachers in the cohort for three years. Movement to other grades and schools, layoffs, and natural attrition continue to be difficult challenges. Several suggested that allowing at least a small percentage of teachers to be added to the cohort during the first funding cycle would really ease this challenge and support completion of professional development by the original target number of teachers.

In addition, despite committed district leaders, coaches, providers, and others, many partnerships continue to function without the involvement of site administrators in planning and implementation. From the practical standpoint of integrating CaMSP classroom follow-up with site-based initiatives to avoid conflicts with other priorities, consistent integration of site administrators continues to be an area for growth within CaMSP.

Because the CaMSP grant cannot be used to directly fund training of site administrators, many partnerships had not considered alternative ways to include site administrators either in leadership and planning or in other ways that support district policies related to instruction and evaluation of teaching. While many partners acknowledged that site administrators are key to sustaining the momentum from individual teacher leaders, there were only a small number of partnerships that had initiated specific efforts to include site administrators such as through district-funded principal trainings or meetings in which instructional strategies embedded in CaMSP professional development were discussed and demonstrated. In a few partnerships, site administrators were involved in or observed the work of collaborative teams such as professional learning communities or lesson study groups

The connection to IHE partners at the partnership level is solid and IHEs are building on their experience with CaMSP in different cohorts resulting in stronger implementation right from the start. However, there continues to be very little evidence of a connection between CaMSP and the institutional priorities of participating IHEs, particularly related to influencing teacher training and linking what is learned from CaMSP to recruitment and meeting the future needs of the mathematics and science teacher workforce. The lack of connection between CaMSP and broader initiatives in higher education is, in part, due to the first priority for most partners of meeting the requirements of the grant and the nature of grant funding being tied to individuals rather than departments as a whole.

In general, IHEs were strong and flexible members of the partnerships and continued to improve on previous experience providing professional development, such as through the Subject Matter Projects or CPEC Improving Teacher Quality grants and other K-12 professional development efforts. Both individuals from IHEs with substantial professional development experience and others new to the process acknowledged that their involvement in CaMSP professional development required a high level of engagement with the LEA partners and tailoring professional development to meet the particular needs of serving a set of teachers during the course of three funding cycles.

With respect to the research component of CaMSP, data collection for the federal and state evaluations has been streamlined and partnerships are responsive to the needs of PW and CDE in collecting the necessary data. For the local evaluations, the requirements by CDE have been clarified and the evaluation plans have improved. In the most recent review of the local evaluation reports conducted by PW, there continues to be improvement both in terms of the capacity of evaluation providers and the visibility of the evaluators, data collection, and sharing of results within the partnerships.

However, there is also evidence that partnerships are often unable to follow through on all components of the proposed evaluation, particularly the comparison or control teacher group both for logistical (hard to recruit and maintain, for example) and for methodological reasons (not enough teachers to make a good comparison, for example). The most urgent need in this regard continues to focus on improved documentation of evaluation methodology, the barriers encountered, and to be able to summarize the results of the professional development despite the inherent challenges of research and evaluation.

The student outcome study conducted for this report included two sets of data with partnership teachers and their students participating in 2008-09 and 2009-10, and there were mixed results overall when data was pooled across cohorts and partnerships. The examination of outcomes overall in 2009 showed positive effects for both the combined mathematics CST scores and Algebra I scores. However, the investigation of 2010 outcomes, which consisted of a different set of cohorts and partnerships than those in 2009 did not produce similar results: the 2010 pooled treatment group, on average, performed no better than its comparison group.

On the other hand, there is evidence that the science-focused partnerships impacted science learning at the 8^{th} grade level, both in 2009 and 2010. Eighth grade science students who had partnership teachers performed better on average on the CST for science in 2009, when compared to students who were not taught by partnership teachers. In 2010, 8^{th} grade students of treatment teachers also performed better, but only slightly.

The pooled analyses in both mathematics and science, however, masked differences in performance that were apparent when the data was examined at the partnership level. Examined individually, some partnerships showed positive, some neutral and some negative outcomes. This exploration into the differences between and among partnerships that had just begun, were midway through, or had completed the implementation of their CaMSP grants suggests that details such as LEA context, professional development model, and partner commitment are likely more important than the stage of implementation or a threshold number of hours of professional development in measurement of student outcomes. Further study of these sets of partnerships, particularly within the newer cohorts will be explored in the next evaluation report, especially related to the implementation context in the concluding year of professional development.

Recommendations & Next Steps

For the most recent year of the evaluation, CaMSP continued to be implemented under No Child Left Behind Act (NCLB) guidelines, legislation passed under the previous Administration. Under the current Administration's Blueprint for Reform, the federal MSP program is envisioned as a competitive grant program in which states compete for funding. While the Administration and Congress have not yet agreed on a plan for reauthorizing the Elementary and Secondary Education Act (ESEA), it is clear that changes may be coming. CaMSP is an important example of effective implementation of a grant program in a large and diverse state that must leverage and build on what has been learned in order to position itself strongly for the Science Technology, Engineering and Mathematics (STEM) initiatives under development at the federal level. In previous reports, PW has offered recommendations to support partnership implementation in two areas: (1) strengthening professional development models, and (2) strengthening research models.

In light of the above discussion related to implementation and the need for documenting outcomes, PW continues to recommend an emphasis in the second phase of the evaluation on strengthening research models and providing technical assistance to partnerships and local evaluators. Local evaluation results will be crucial to prove outcomes at the local level and point the way for further research in the field of effective professional development.

Strengthening the Research Models to Prove Professional Development Models...

Identify and share best practices in research and evaluation. With nine cohorts of grants funded to date, local evaluation results should play a key role in providing evidence of the success of individual partnerships and the state as a whole. The release in June 2011 of two Request for Applications (RFA), one for Cohort 9 partnerships and one for up to five "demonstration sites" based on evidence of prior success, provides an opportunity to identify those partners (both IHEs working with new LEAs and LEAs implementing a replication of a similar model for professional development with a new set of teachers) that have "proven" the success of their model using evidence from evaluation studies and locally collected data. As California positions itself for the possibility of an increasing share of federal funding that is awarded competitively, these efforts can be a key component of achieving success. At the state level, CDE can be a hub for encouraging this kind of dissemination.

Encourage and support the development or sharing of strong or exemplar local assessment systems to better measure student outcomes. While there are some examples of local assessment systems being revised, upgraded and/or better aligned as a result of a CaMSP grant, especially within mid-size single district partnerships, there is a tremendous amount of variation within California in the use of assessment data to pinpoint instructional strategies that target particular student needs (either individually or as groups). As the state moves toward implementation of the Common Core Standards in Mathematics and English Language Arts, there is an opportunity for CaMSP to play a role in alignment of professional development and local assessment systems in mathematics. Without a similar effort in science, there continues to be a great need to both raise its visibility as a core subject area and to share local assessments.

Strengthen local research/evaluation projects. As California has participated in the federal initiative, the imperative for the quality of the local research that is being conducted continues to be important to successful implementation. The requirement for the local evaluation has always existed and been enforced at the state-level in the RFA, but detail on the importance of key measures and emphasis on quality research at the local level is of central importance. Based on the legislation and structure of the participant cohort, CaMSP is a research project first, professional development program second. In this most recent evaluation, PW has found that the visibility within partnership leadership and decision-making and capacity of local evaluators has improved. Partnerships report more use of evaluation data in revising and refining professional development activities and evaluation results are integrated and disseminated within the partnership so that teachers understand why it is important to the overall effort. However, in the review of evaluation reports attached to the federal APR, PW continued to find some uneven implementation of key aspects of the evaluation including the measurement of teacher content knowledge and recruiting and maintaining a strong comparison group of teachers.

Provide technical assistance in teacher assessment and flexibility in methodologies for comparison groups. With the requirement at the federal level to assess teacher content knowledge and the limited number of valid, reliable instruments that are available, partnerships continue to need guidance on how to reasonably and appropriately comply with this requirement and make it a useful data collection effort. In addition, CDE RFAs have required that partnerships compare results of teacher content assessments with a matched control group of teachers. Partnerships continue to struggle to determine how to implement assessments of teacher content knowledge, find a matched control up-front, and maintain a control group over time.

Strengthening Professional Development Models to Meet Goals and Targets...

In terms of previous recommendations related to implementation of CaMSP professional development models at the local level, much progress has been made both by CDE and by local partnerships.

In last year's report, PW recommended that CDE continue to help sites refine models and encourage consistency in defining "intensive" and "follow-up" activities. For this evaluation report, PW observed that most partnerships have clearly defined the model of implementation in response to refinements made in CDE's RFA. While local partnerships have been clearer in terms of the model for professional development and how intensive hours will be delivered, there continues to be considerable variation in terms of the implementation of classroom follow-up hours and difficulty in identifying just what about the classroom follow-up is effective and worth continuing after the project has concluded. Partnerships indicated that the length of time for implementation and the strength of the cohort of teachers who have agreed to participate has allowed for the emergence of teacher leaders, observable changes in practice, and an openness to collaboration that hadn't existed before. ***The need now is to examine the success of the model (or models) as a whole and the contribution of these efforts to what is being learned about professional development in mathematics and science, and how to bridge strengthened systems for professional development to other curricular areas.***

PW also recommended that CaMSP continue to focus on the integration of other statewide initiatives in mathematics at the state and local level and with other policymakers. CaMSP partnerships are involved with mathematics and science California Subject Matter Projects and other IHE's, and CPEC's Improving Teacher Quality initiative, which are supporting the integration of Board-adopted materials, textbook adoption in mathematics and science, and other state level initiatives. The Mathematics and Science Leadership Office (MSLO) of the California Department of Education (CDE) continues to reach out to CPEC and the California Subject Matter Project leadership and will continue to provide guidance on how CaMSP efforts can support, enhance, and reinforce other statewide core academic initiatives, particularly those which impact underperforming schools and districts. These efforts will be especially important to leverage as California deals with its continuing budget crisis and as programs evolve at the federal level.

The other two recommendations in last year's report—that CaMSP (1) ***Encourage involvement of IHEs across departments that align to long-term needs of teacher workforce in mathematics and science,*** and (2) ***Provide support to districts (especially small, rural districts) to sustain professional development efforts and build professional development capacity*** continue to be relevant in the current context. In terms of institutional change at the IHE level, most of the involvement with CaMSP occurs at the individual level, with interested professors and others from the educational community with long term connections to K-12 education. Despite the quality of this engagement and involvement of individuals, departmental and administrative involvement across disciplines and with education departments continues to need to be strengthened.

Finally, in order to sustain the efforts and momentum of CaMSP, PW recommends that CDE build in some flexibility with regard to the teacher cohort that is served by the grant, perhaps by extending the timeframe for establishing the cohort to the first grant cycle or allowing for flexibility of grade levels being served. While tightening the rules for teacher participation has ensured that teachers who participate understand the long-term commitment and resulted in much improved completion of sustained professional development, it is important to acknowledge that a small portion of teacher attrition is beyond the control of the partnership. In the tight budgets of today, newer teachers are often the first to be let go and there is substantial movement of teachers from school to school and to new grade levels that may or may not be served by the partnership. For example, in partnerships that have built school-based grade-level teams, it may be helpful to be able to add teachers to the cohort and it is a significant barrier to implementation when teachers are excluded from training. While PW continues to encourage partnerships to build in over-recruitment of the cohort, a minimal amount of flexibility can still achieve the goals of the research study and accommodate local constraints beyond the control of the partners.

Next Steps

PW is concluding the seventh year of the evaluation in 2011 and is focused on the qualitative study of Cohorts 5 through 7 and the Research Cohort. The teacher and partnership surveys have been administered to all currently operating partnerships with site visits focused on more recently funded partnerships. The student outcome study will continue with the addition of Cohort 7 treatment teachers and their matched comparison. PW will continue to support local partnerships in the completion of federal and state reporting requirements through the CaMSP database. PW will update evaluation efforts and provide technical assistance to partnerships and their local evaluators through conference calls, cohort orientations, Learning Network meetings and the CaMSP page on the central Web site: www.publicworksinc.org.