



# **The Instructional Leadership Corps**

## ***Entrusting Professional Learning in the Hands of the Profession***

Rachel A. Lotan, Dion Burns, and Linda Darling-Hammond

# **The Instructional Leadership Corps**

***Entrusting Professional Learning  
in the Hands of the Profession***

Rachel A. Lotan, Dion Burns, and Linda Darling-Hammond

## Acknowledgments

The authors thank the many people and organizations that support the Instructional Leadership Corps. We appreciate the time and insights provided by the many teacher leaders who participated in this study and allowed us to observe their professional learning workshops and to visit their classrooms. We thank the staff of the Stanford Center for Opportunity Policy in Education, the National Board Resource Center, and the California Teachers Association for their support of the ILC as well as the information and data they provided.

We also thank the following current and former LPI colleagues and fellows for their support, insights, and feedback: Danny Espinoza, Roberta Furger, Roneeta Guha, Tara Kini, and Leib Sutchter. We are grateful for the assistance with data collection and analysis provided by LPI interns Hans Hermann, Shannon Etz, and Kriti Garg. We appreciate Aaron Reeves and Amber Hu for their editing and design contributions and Lisa Gonzales, Erin Chase, and Gretchen Wright for overseeing the editorial process. Without the generosity of time and spirit of all of the aforementioned, this work would not have been possible.

Funding for this project was provided by the S. D. Bechtel, Jr. Foundation. Core operating support for the Learning Policy Institute is provided by the Sandler Foundation, the William and Flora Hewlett Foundation, and the Ford Foundation. We are grateful for their contributions. This work does not represent the opinions of these or any other supporting organizations.

### External Reviewers

This report and the case studies cited herein benefited from the insights and expertise of four external reviewers: Julie Bianchini, Professor of Science Education at the University of California at Santa Barbara; Ronald Herring, Executive Director at Equity and Access; Nicole Holthuis, Research Associate at the Stanford Center for Assessment, Learning and Equity; and Dey Rose, Teacher Mentor and Instructor at Stanford University's Graduate School of Education. We thank them for the care and attention they gave the report. Any shortcomings are our own.

The appropriate citation for this report is: Lotan, R. A., Burns, D., & Darling-Hammond, L. (2019). *The Instructional Leadership Corps: Entrusting professional learning in the hands of the profession*. Palo Alto, CA: Learning Policy Institute.

This report can be found online at <https://learningpolicyinstitute.org/product/instructional-leadership-corps-professional-learning>.

This work is licensed under the Creative Commons Attribution-NonCommercial 4.0 International License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc/4.0/>.



# Table of Contents

<b>Executive Summary</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>1</b>
Background .....	1
The ILC’s Professional Development Approach .....	2
<b>This Study</b> .....	<b>4</b>
<b>The Instructional Leadership Corps: Teacher-Led Professional Development</b> .....	<b>5</b>
California Context.....	5
Design of the ILC Program .....	7
Professional Development Workshops (PDWs).....	9
Systemic Educational Change and the ILC .....	10
<b>The Instructional Leadership Corps in Action</b> .....	<b>11</b>
Madera Unified School District .....	12
Conejo Valley Unified School District .....	15
The East Side Alliance (ESA) .....	22
North Orange County / Fullerton .....	28
<b>Impact on Teaching and Learning</b> .....	<b>33</b>
Instructional Shifts.....	33
Student Engagement and Learning .....	37
<b>Changing Systems and Professional Relationships</b> .....	<b>41</b>
Professionalism and Teacher Leadership Development .....	41
Supporting Quality Beyond the Single Classroom: A Community of Professionals.....	43
<b>Lessons Learned</b> .....	<b>47</b>
<b>Conclusion</b> .....	<b>51</b>
<b>Appendix A: Instructional Leadership Corps Study Methodology</b> .....	<b>52</b>
<b>Appendix B: Model for Professional Development Sequence</b> .....	<b>53</b>
For Teachers: Essential PD Workshop Components.....	53
For Site-Based Leaders: Essential PD Workshop Components .....	54
<b>Appendix C: Madera USD ILC Workshops: Sample Resources for Teachers</b> .....	<b>55</b>
<b>Appendix D: Inaugural “Teachers Teaching Teachers” Conference Sessions</b> .....	<b>58</b>
<b>Endnotes</b> .....	<b>60</b>
<b>About the Authors</b> .....	<b>62</b>

## List of Figures and Tables

<b>Figure 1</b>	Instructional Leadership Corps Members by Role .....	8
<b>Figure 2</b>	Commonalities Among the Practices in CCSS and NGSS .....	13
<b>Figure 3</b>	Slide from “Shifting Gears to the Common Core” Workshop .....	17
<b>Figure 4</b>	Common Core Instructional Shifts in ELA and Mathematics .....	33
<b>Figure 5</b>	Template for Paper Diamond .....	35

## Executive Summary

The Instructional Leadership Corps (ILC) is a California collaborative teacher professional learning project in which expert teachers organize local professional development to spark iterative changes in practice. Launched in 2014, ILC is a joint effort of the California Teachers Association (CTA), the National Board Resource Center (NBRC), and the Stanford Center for Opportunity Policy in Education (SCOPE).

The ILC changes the paradigm for teacher learning from one dependent on outside consultants, who often conduct one-shot workshops before they leave for the next district, to one that engages local professionals who have been trained and supported to lead ongoing learning within their own districts—and, in many cases, to carry that learning to other schools and districts in their region.

Over 4 years, more than 250 teachers and administrators who comprise the ILC have served more than 100,000 California educators through a professional learning approach that supports school-based learning, develops additional teacher leaders as well as instructional leadership among administrators, and has begun to strengthen the capacity of schools and districts in California to implement the Common Core State Standards (CCSS) and the Next Generation Science Standards (NGSS). The CCSS and NGSS are moving instruction away from a transmission curriculum that often featured scripted lessons and multiple choice tests toward higher order thinking skills acquired through student engagement in inquiry and problem solving—a shift that requires major transformations in how teachers teach and how teachers learn.

Implementing these changes across California—a large state serving a diverse and high-need student population, and one that has experienced significant teacher shortages—poses considerable challenges. A new funding formula and accountability system has shifted decision making to the local level and allowed districts and schools to seek out and implement innovative learning opportunities for teachers.

### ILC Program Design

The ILC’s purposeful approach, “teachers teaching teachers,” empowers teachers to lead sustainable professional development and advance instructional capacity within their districts. ILC instructional leaders are primarily teachers, augmented by a smaller number of administrators, who have received intensive professional development from ILC experts on how to implement the key instructional shifts required by the new standards.

These instructional leaders bring that knowledge back to their home districts in the form of multiple **professional development workshops (PDWs)** interspersed with teacher-designed changes in classroom practice followed by opportunities to reconvene, reflect on, and refine these efforts, a hallmark of the ILC project. During these workshops, the leaders demonstrate what an instructional shift called for by the standards looks like in the classroom, support their colleagues in engaging in new practices and carrying them to their students, and then in developing appropriate lesson plans. In subsequent sessions, teachers analyze real-world results from the new practices, examine student work samples, and refine their approaches. In this iterative and collaborative process, teachers receive the ongoing support and development they need to make sustained and standards-aligned changes in classroom instruction.

The ILC's reach has been extraordinary. Since its inception in 2014, ILC leaders have provided multi-session professional learning to more than 32,000 educators statewide, in more than 2,000 schools and at least 495 districts in California. An additional 30,000 educators participated in ILC-related conferences and presentations, and 38,000 more were indirectly impacted as ILC members trained instructional coaches in a trainer-of-trainers model. The responses of these educators to ILC conferences and trainings has been overwhelmingly positive, with many participants identifying this as the best professional learning experience they have had.

In this study, we sought to discover how ILC teams in different settings gained traction and began to transform professional learning opportunities in their communities and regions, often addressing long-standing problems of practice and inequities in children's access to high-quality instruction. Given that practitioner-led professional learning has often failed to gain a toehold in districts where teacher leaders are appointed but not integrated into the work of the schools, we wanted to understand what has enabled the work of the ILC to grow and become rooted in various communities. We examined the strategies used by ILC leaders both in conducting professional development and in connecting their work to the broader efforts of their districts and counties. We also examined the perceived impacts on practice for teacher participants.

We studied the work of ILC teams at four very different sites:

- Madera Unified School District in rural San Joaquin Valley, serving largely Latino/a students, with varying levels of English proficiency, from low-income families. There the ILC focused on language development across the curriculum.
- Conejo Valley School District, a high-achieving and well-resourced district in Ventura County, where the team focused on building science competencies and aligning instruction from elementary to high school.
- The East Side Alliance, a formal partnership between East Side Union High School District and its seven k–8 feeder districts in East San Jose, which range from moderate to extremely low-income. There the teams worked with and learned from each other as they supported new approaches to standards-based mathematics instruction.
- A partnership between the ILC leaders' network in North Orange County and California State University at Fullerton's College of Education, which worked across a wide range of districts through a series of "Teachers Teaching Teachers" (TTT) conferences focused on the instructional shifts in the standards. These efforts led to new mentoring programs for both beginning teachers and high school students interested in teaching.

In each of the four sites, we interviewed ILC leaders; participating teachers; and school, district, and county administrators. We observed professional learning workshops, statewide conferences, and conferences organized by ILC teams. We also observed classrooms of teachers who participated in workshops led by ILC leaders.

## ILCs' Impact on Teaching and Learning

We found, like earlier evaluators, that the ILC project resulted in changes in instructional practice and greater student engagement in learning. Most participants in ILC workshops consistently report that their ILC experiences have influenced their curriculum, instructional strategies, assessments, student engagement, and student learning to a “great extent.” During classroom observations, we saw teachers incorporate strategies and tools learned in the ILC workshops. Teacher leaders and administrators described noticing a change in teacher mindset after the ILC work—teachers felt empowered to give more control to students and engage more with challenging parts of the curriculum.

Teachers commonly attributed to ILC the increased levels of student engagement they witnessed: Students were more actively involved in lessons, explored multiple ways to solve a problem, exhibited perseverance in tackling difficult problems, and were more confident and empowered when faced with challenging subjects.

The ILC gave teachers a renewed sense of collegiality, purpose, and common mission that reaffirmed their professional identity, kept them engaged in their work, and gave them a sense of responsibility that extended well beyond their individual classrooms. Teacher leaders at all four sites found ways to collaborate with school and district leaders, as well as their teacher associations, to reach more teachers and to connect with organizations outside their districts, such as counties and universities, to realize systemic changes in the landscape for professional learning in their regions.

The ILC's success in helping teachers acquire sophisticated new practices while developing instructional leadership, increasing professionalism and self-efficacy, and building successful systems of professional learning reflects a promising model.

## Lessons Learned

We noted a number of lessons from our examination of the ILC in action:

### **1. Teachers value professional learning led by their colleagues.**

When asked to compare ILC workshops with traditional professional development offered by outside consultants, teachers expressed their unconditional preference for learning from and with their colleagues. Teacher leaders were attentive to local needs; attuned to the specific implementation challenges facing teachers in their districts; and more accessible for follow-up questions, advice, and support. Teachers who participated in teacher-led workshops valued these experiences, recognizing that their colleagues were responsive to and knowledgeable about the shared context and the educational needs of their students and could demonstrate, not only describe, some of the recommended instructional shifts.

### **2. ILC membership enhances teacher leaders' professionalism and sense of efficacy.**

Beyond the effect on teachers' work in their home districts, creating and leading professional learning for colleagues was highly beneficial for the ILC teacher leaders. Realizing that they were having an impact on shaping other teachers' practice increased their sense of professional efficacy. Broadening their professional reach beyond their classrooms, they strengthened their leadership skills as they initiated innovative activities and solidified professional relationships. ILC members were proud of their work and accomplishments, and empowering the profession was a frequent theme in the interviews of teachers.

### 3. Supportive structural arrangements foster instructional change.

Adoption of CCSS and NGSS required curricular and pedagogical shifts that were ambitious, profound, and demanding. Moving from scripted curriculum and pacing guides to planning lessons with engaging learning activities could not happen quickly or effortlessly.

The shifts in instruction necessitated changes in **instructional leadership and teaching evaluations**. To align with more student-paced learning, administrators had to shift how they conducted classroom observations and provided feedback to teachers. Given their role in allocating resources and acting as instructional leaders, school and district administrators must be aware of and involved in sustained changes in instruction.

More **time and opportunities for professional collaboration** were critical to implementing instructional changes. ILC teachers and their colleagues needed time and material resources to plan lessons, observe each other's classrooms, analyze the work of their students, and discuss and reflect together on their experiences. Teachers had more opportunities to do so when administrators at the school and district levels provided resources and built structures that allowed and supported collegial collaboration.

### 4. Systematic follow-up contributes to implementation of instructional shifts.

Achieving depth versus reach is a perennial dilemma in teacher professional learning initiatives. Lasting changes in pedagogy are more likely to occur when teachers can try new strategies, receive feedback, address challenges in implementation, and iteratively improve over the course of multiple workshops, with advisors and coaches at hand. This raises the question of how to reach a large enough number of teachers while still providing the kind of close support associated with meaningful changes in pedagogy.

Frequency and quality of the follow-up opportunities are indispensable. Follow-up usually consisted of teacher self-reports; verbal or written reflections with colleagues; and, sometimes, samples of student work. Meaningful follow-up was important but rare, and involved either the modeling of teaching practices in the classroom by ILC teacher leaders or observation and feedback of participant teachers trying out the instructional strategies. Designing for long-range engagement and follow-up is a key element of lasting change and should be part of initial plans so that the many benefits of teacher-led professional development can be secured.

### 5. Strategic relationships support deeper, more widespread professional learning.

ILC teacher leaders gained the greatest traction when they were able to build relationships with district administrators, teachers associations, county offices of education, universities, and philanthropic organizations. Partnerships with these institutions supported content alignment and leveraged financial and logistical resources at the local level.

As mutual trust developed, **districts and teachers associations** were increasingly willing to contribute financial resources, support, and logistical assistance. ILC teams were more successful when they connected to organizations and institutions that recognized the inherent value of their work and were willing and able to provide support and resources. Maintaining these connections and establishing productive relationships are necessary for project continuation and institutionalization.

The **foundational support of ILC's institutional partners** was indispensable. SCOPE, NBRC, and the CTA provided ongoing guidance, access to intellectual and academic resources, sustained professional interactions, upkeep of the professional network, and personal recognition. The existence of a solid organization that guides, documents, and assesses the outcomes of the ILC project is vital for its continued success.

The ILC is a pathbreaking effort offering a solid template for providing professional learning opportunities to educators. The next phase of the project is to expand to more districts throughout California and ensure that the practices take root in local communities by deepening partnerships and garnering resources to sustain ILC activities, thereby deepening teachers' knowledge of the new standards and the instructional capacity needed to support students in meeting them.

## Introduction

The work that I've been doing with the Instructional Leadership Corps (ILC) has helped me grow as a professional, [it has helped] my kids grow, and when I'm doing PD [professional development], I help other teachers understand what Common Core is. It's not just integrating one or two lessons that are Common Core-ish. It's helping the kids make all these connections and seeing how it applies to the real world.

—Teacher leader, ILC

It's a sustainable model. It's a unique project. It's exciting to think that the power of an idea could make that big a difference. I hate to say it, as a classroom teacher you're not used to being able to have that kind of exponential influence. But that's what CTA [California Teachers Association] and Stanford and the National Board are doing with this project. It's giving teachers the ability to identify a need, go and fill it, and then be able to provide that lesson or skill set to others. So that's pretty exciting.

—Teacher leader, ILC

These two California teachers are describing a new model of professional learning offered by the Instructional Leadership Corps (ILC)—a group of expert teachers who organize local professional development (PD) to spark iterative changes in practice. Over only 4 years, the ILC has connected with 101,000 California educators<sup>1</sup> through an approach that supports school-based learning, develops additional teacher leaders as well as instructional leadership among administrators, and has begun to transform statewide capacity in California to implement the Common Core standards and the Next Generation Science Standards.

The Instructional Leadership Corps has changed the paradigm for teacher learning in California. In lieu of outside consultants who often conduct one-shot, “drive-by” workshops before they leave for the next district, the ILC entrusts professional learning in the hands of local professionals who have been trained and supported to lead ongoing learning within their own districts—and, in many cases, to carry that learning to other schools and districts in their region.

## Background

The ILC is a statewide collaborative teacher professional learning project launched in 2014 by the California Teachers Association (CTA),<sup>2</sup> the National Board Resource Center (NBRC),<sup>3</sup> and the Stanford Center for Opportunity Policy in Education (SCOPE).<sup>4</sup> The initiative was a response to California's adoption of the Common Core State Standards (CCSS) in mathematics and English language arts and the Next Generation Science Standards (NGSS). The state also adopted the Smarter Balanced Assessment System, now called the California Assessment of Student Performance and Progress (CAASPP). This assessment system uses a wide variety of items, including performance tasks, to assess students' abilities to apply critical thinking and complex problem-solving skills to real-world tasks and dilemmas.

These new standards and the accompanying assessments required wide-reaching shifts in the ways students learn and teachers teach. The new standards expect teaching and learning to focus on problem solving, investigation, collaboration, use of evidence, effective communication, and self-directed learning. From classroom instruction that often featured scripted curricula to learning tasks focused on higher order thinking skills developed through student engagement and inquiry, and from teaching to multiple-choice tests to problem solving aimed at performance assessments, it was clear that curricula, classroom structures, and interactions among the teachers and their students needed to change. Achieving the associated changes in instructional practice requires transformations in how teachers teach, how schools are led, and how school-based conditions support teachers' continuous professional learning.

“Teachers teaching teachers” is the ILC’s purposeful approach to empowering teachers to lead sustainable professional development and advance instructional capacity within their districts.

Implementing these changes across a large state serving a diverse and high-need student population posed considerable challenges, compounded by a significant teacher shortage driven in large part by high attrition rates. A new funding formula and accountability system that shifted decision making to the local level also made it possible for districts and schools to look for innovative ideas for how to provide learning opportunities for teachers. Rather than the top-down standardized professional development offerings that California offered in the 1990s and early 2000s, or the use of outside vendors who popped in and out of districts when state-sponsored professional development was discontinued, the advent of local control allowed districts to undertake the more organic capacity-building strategies offered by the ILC.

“Teachers teaching teachers” is the ILC’s purposeful approach to empowering teachers to lead sustainable professional development and advance instructional capacity within their districts. ILC instructional leaders who work in districts and schools all over California are primarily teachers, with a lesser number of site-based administrators. They have been working continuously over the past 4 years to deepen their practice as professional learning facilitators and to expand their reach across the state. In the process, they have developed leadership at the local level and have connected districts, counties, and universities to one another and to teachers seeking to learn.

## **The ILC’s Professional Development Approach**

ILC leaders instituted an approach to professional development that differs from the widespread single workshops prevalent in the past. Having participated in intensive professional development in annual statewide and regional ILC conferences and retreats, the ILC leaders learned about the key instructional shifts embedded in each set of new standards and about ways to transform classrooms to meet these shifts. They constructed a process in which teacher leaders demonstrate the shifts, support their teaching colleagues as they engage in the new practices, reflect on how to carry them to their students, and develop a plan for trying one of the new practices. Subsequently, the teacher leaders meet again with colleagues to analyze and reflect on what happened, examine student

work samples, and refine their practice. They share strategies that worked for them while acquiring additional tools for implementing the new standards.

Because the ILC members are still teaching and leading schools in their districts, the ongoing problem solving needed for significant and lasting change to take root can occur in department and team meetings, in individual classrooms, and in other professional development settings offered by schools, by the district, and—as we have seen in this study—by county offices and local universities. ILC members extend their efforts to bring about systemic change by investing in the development of professional relationships and forming partnerships among schools with each other and with their districts, county offices, nearby universities, and support organizations.

The iterative process of learning, engaging, experimenting, reflecting, and refining practice has led local teachers to embrace the professional learning process and the standards. The ILC efforts have been warmly received by teachers and school leaders. In post-workshop surveys of thousands of participants, large majorities of educators consistently report that their ILC experiences have influenced their curriculum, instructional strategies, assessments, student engagement, and student learning to a “great extent” (well above 4 on a 5-point scale). They also consistently reply that the workshop sessions were “very” or “extremely” helpful to them, giving them information and tools they can and have used to make instructional or leadership shifts.<sup>5</sup> These kinds of comments are common:

Learning a strategy to implement an ELA shift in my classroom the next day made me try it out. Knowing that I was expected to bring student work to follow up made me feel accountable, so I did the lesson. Having [the ILC member] at school where I could ask for help made my try at the shift more successful. Getting the document that showed how the shift applied to standards at my grade-content level helped me plan how to apply the shift without needing to do lots of finding on my own. This was the most useful PD I have had in years. Thank you.

This is PD at its finest, when the teachers walk out both inspired and motivated to attempt to replicate what they saw. Kudos to ILC for empowering teachers to teach teachers. I’ve never walked away from consultant-based training with the same fervor or resolve.

I’m excited about teaching new/challenging vocabulary to my students. Kudos for the presenters! Great job! Very interactive, loved the best practices shared and collaborating with teachers from other schools. This was an awesome professional development. It was great to share lesson ideas with teachers from other schools. I would like another PD like this one!

The reach of the ILC has been extraordinary. Between November 2014 and September 2018, in more than 2,000 schools and at least 495 districts in California (nearly half of the total number of districts), ILC leaders provided multi-session professional learning workshops to support the implementation of the CCSS to more than 32,000 educators statewide. According to a survey of ILC teacher leaders, “Over 85% of respondents felt that their participation in the ILC had influenced student learning to a ‘great extent’ or ‘some extent.’”<sup>6</sup> Close to 30,000 educators participated in ILC-related conferences and presentations, and an additional 38,000 were indirectly impacted as ILC members trained instructional coaches in a trainer-of-trainers model.<sup>7</sup>

The project and its members have gained increased visibility in California and nationwide through various publications and venues, as well as presentations and conference participation by its members. ILC educators have taken on different roles and responsibilities within their schools, districts, and county offices, as well as at the state level. Since 2017, the project has had two additional proclaimed goals for the future: to reach districts in historically isolated regions of California and to help the project take root in districts in which activities have been ongoing.

## This Study

The work of the ILC has been documented and monitored over the course of its existence to provide information and formative evaluation for continuous improvement. The Stanford Center for Opportunity Policy in Education (SCOPE) regularly collects evaluation data from participants in the ILC workshops and other learning activities and uses those to improve the program each year. Vital Research, a social science research organization,<sup>8</sup> conducted an early evaluation of the program to examine its reach and impact.<sup>9</sup>

This study sought to ascertain how ILC teams in different settings gained traction in their communities and began to transform professional learning opportunities in their regions of the state, often addressing long-standing problems of practice and inequities in children's access to high-quality instruction. We investigated the work of ILC teams at four sites: Madera Unified School District in California's Central Valley; Conejo Valley School District in Southern California; the East Side Alliance in Northern California; and the ILC leaders' network in North Orange County, connected with California State University at Fullerton's College of Education.

The case of Madera Unified School District describes how ILC leaders find ways to respond to students' learning needs in a low-income, rural community in California's Central Valley. In Madera USD, 90% of the students are eligible for free or reduced-price meals. In 2017, when data collection for this study began, 88% of students in the district were of Hispanic or Latino/a heritage. English language and literacy development was one of the district's key goals, which guided much of the work of the ILC in this district.

By contrast, Conejo Valley School District, located between Ventura and Los Angeles counties in Southern California, is well-resourced and is recognized as a high-achieving district. Around 67% of Conejo Valley students met or exceeded state standards on the CAASPP in 2016–17, at the time of data collection for this study, compared with 49% statewide.<sup>10</sup> Although science achievement progressively rose on state assessments from 2005 to 2013,<sup>11</sup> the community urged the schools to continue their focus on raising science achievement across all grade levels. This is a case in which ILC teacher leaders invested effort in creating vertical alignment in teaching inquiry-oriented science across all school levels.

The East Side Alliance, an educational partnership between a high school district and its seven feeder districts in Silicon Valley, represents a set of districts serving 82,000 students from both affluent and low-income families. We examined the activities of two ILC teams from two different districts, focused on successful implementation of the CCSS with emphasis on mathematics and bolstering African American and Latino/a students' graduation rates.

The North Orange County Network was created by ILC teacher leaders from different districts around California State University Fullerton. Their activities expanded beyond the initial goal of the ILC project as they put their efforts into ways to strengthen and diversify the profession in the region. This case illustrates the power of professional networks and the benefits of building strong relationships with an institute of higher education that is committed to teacher learning along the professional continuum, from pre-service to professional development.

Given that practitioner-led professional learning has often failed to gain a toehold in districts in which teacher leaders are appointed but not integrated into the work of the schools,<sup>12</sup> we wanted to understand what has enabled the work of the ILC to grow and become rooted in various communities. We examined the strategies used by ILC leaders both in conducting professional development and in connecting their work to the broader efforts of their districts and counties. We also examined the perceived impacts on practice for teacher participants and, more widely, for the nature of practice in schools; districts; and, in some cases, counties and regions.

We conducted interviews and observations in each of the four sites. We interviewed ILC leaders; participating teachers; and school, district, and county administrators. We observed professional learning workshops, statewide conferences, and conferences organized by ILC teams. We observed classrooms of teachers who participated in workshops led by ILC leaders. (See Appendix A for more details about our methodology.)

In this report, we first set the stage by describing the educational context in the state, and the design and the reach of the ILC. Next, we describe the activities and the impact of the ILC teams in their respective sites. Subsequently, in a cross-case analysis, we examine the similarities and the differences in the work of the ILC teams at the different sites. Finally, we discuss lessons learned from the study and offer recommendations for the ILC's continued efforts.

## **The Instructional Leadership Corps: Teacher-Led Professional Development**

The ILC was designed and launched in the context of a set of major changes affecting school funding, standards, curriculum, and governance in the state of California. This context had profound implications for how the initiative unfolded.

### **California Context**

As California approached the implementation of its new standards, the state was still in recovery from several decades of tax cuts and budget cuts after the passage of a tax cap in 1979, exacerbated by the effects of the 2008 recession. The fiscal crisis had a profound impact on the educational system and its districts, schools, students, teachers, and administrators. Severe budget cuts led to massive layoffs of personnel and reduced resources, resulting in increased class sizes and diminished services.

While wealthier schools were able to protect and maintain some level of educational quality by offsetting budget cuts through local revenue sources and private donations,<sup>15</sup> adverse outcomes were most dramatic in schools serving students from low-income families, particularly those with

high proportions of Latino/a, African American, and immigrant students. A 2010 study by the University of California Los Angeles found that “such schools were eight times as likely as other schools in the state to face severe shortages of qualified teachers.”<sup>14</sup>

In many of these schools, teachers were at the front lines of trying to maintain quality education for their students under difficult conditions. With severe cutbacks in educational programs, resources, and professional development days for teachers, juxtaposed against an unceasing demand for test score improvements, many districts adopted teacher-proof, scripted curricula and pacing guides. These required complete fidelity and, according to research on teacher perceptions, curtailed teachers’ decision making and eroded their sense of self-efficacy, professional identity, and pride.<sup>15</sup> This challenging environment also reportedly strained relationships between district administrations and the union, and lowered morale across the teaching profession.<sup>16</sup>

As California’s economy improved and education funding stabilized with the passing of Proposition 30 in 2012,<sup>17</sup> the impacts of the recession lingered. The shift to the Local Control Funding Formula in 2013–14, which coincided with the adoption of the new standards and assessments, gave greater flexibility to districts to allocate resources based on local needs. As revenues increased, the state also allocated significant funds to districts for professional development and technology investments in each of the initial years of Common Core implementation.

Under Governor Jerry Brown, who adopted a philosophy of “subsidiarity,” most decisions about how to run school districts were no longer made through regulations and categorical programs from the state level but rather were placed in the hands of local communities through their Local Control and Accountability Plans. Thus, as teachers needed to gear up for making major changes in how to support and assess their students’ learning, decisions about how to support them needed to be made at the local level.

In a study of the implementation of Common Core standards in California, researchers found that, overall, administrators and teachers were enthusiastic about the new standards and the pedagogical shifts they implied.<sup>18</sup> While they found that a wide variety of local partnerships were created to support implementation, there were also serious challenges. These challenges were of three kinds: limited time to get ready, insufficient availability of appropriate curricula and instructional resources, and worries about the professional capacity of teachers to implement major pedagogical shifts and about the system to support them.

Responding to this context and associated challenges, faculty and staff of SCOPE, who initially conceived of the idea of starting and institutionalizing a program of teacher-led professional development, partnered with the California Teachers Association (CTA) and the National Board Resource Center (NBRC) at Stanford to draw upon their institutional expertise in high-quality professional development and upon their network of accomplished teacher leaders.

SCOPE fosters research, policy, and practice with an emphasis on equitable resourcing of high-quality educational systems and building educators’ professional capacity. CTA supports teachers in multiple ways, including professional learning opportunities. NBRC supports professional development and promotes teacher leadership as candidates progress toward and obtain National Board certification.

## Design of the ILC Program

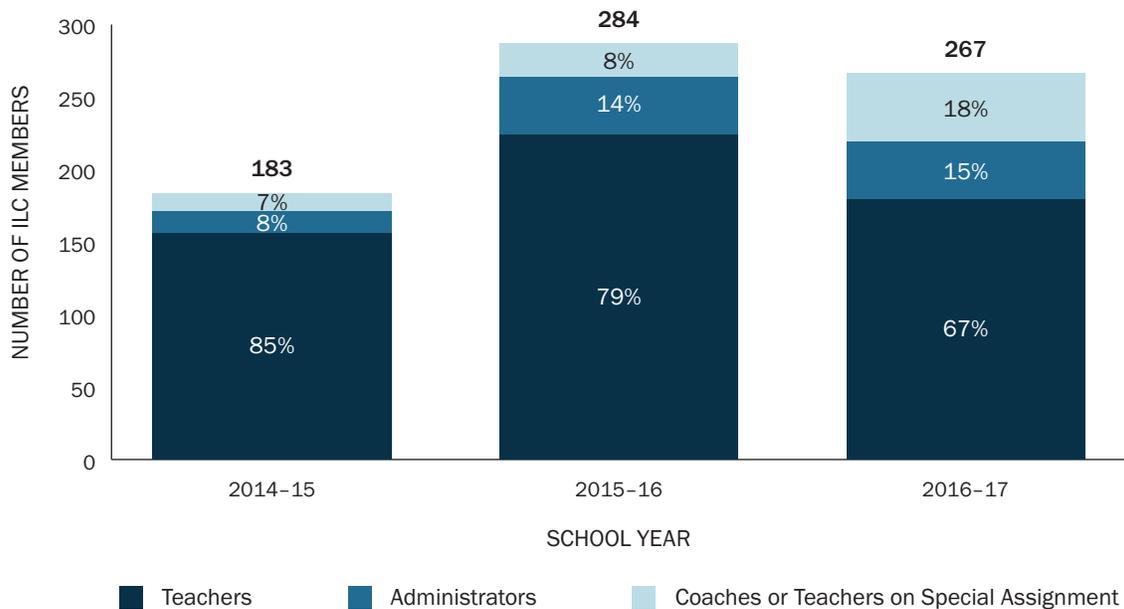
The extensive cuts in state budget during the 1990s and early 2000s nearly obliterated the professional development infrastructure the state once had in place, and left districts primarily reliant on textbook vendors and other fee-for-service organizations coming in from the outside to offer professional development. The ILC represented an opportunity to draw on teacher knowledge to develop their collective capacity and connect this to continuous improvement efforts in schools and districts.

Forming the partnership, SCOPE, NBRC, and CTA leveraged their collective resources and expertise in professional learning and teacher leadership. They also brought together philanthropic organizations active in the field of education—the S. D. Bechtel, Jr. Foundation; the Stuart Foundation; the National Education Association; the California Education Policy Fund; and the Silicon Valley Community Foundation—who committed to funding the ILC for an initial 3-year period and provided input to shape the program, drawing on their pooled experience.

Bringing together a range of educational experts and stakeholders, representatives from the three organizations met in the summer of 2014 to design the program. The ILC was launched at a 3-day event in October 2014. An initial cadre of 183 teacher leaders and site leaders was selected from an applicant pool of 500.<sup>19</sup> Selection criteria focused on evidence of instructional expertise and leadership and sought to balance geographic distribution and expertise across subject areas. Many applicants had formal or informal leadership experience, were National Board certified, and/or had been participants in CTA's Institute for Teaching. According to one of the central staff members of the ILC project, the focus of the selection process “has always been on teams from local communities as a key ingredient in developing local educators' capacity” in order to develop a “critical mass of like-minded individuals with shared goals and complementing strengths within the building and district.”

Several expert teachers had also been union representatives. The total corps of instructional leaders was significantly expanded to 284 for the second year, and subsequently reduced slightly to 267 for the third year of the program. Between the first and the third years of the program, the proportion of coaches and Teachers on Special Assignment (ToSAs) increased from 7% to 18%, and the proportion of administrators increased from 8% to 15%. Figure 1 shows the proportion of educators in the different roles with the ILC.

**Figure 1**  
**Instructional Leadership Corps Members by Role**



Source: Chart reproduced from SCOPE 2018 final report to funders.

To develop the leadership capacity of ILC members, the partner institutions convened regional and statewide conferences and provided access to experts and scholars in English language arts and English language development, mathematics, and science, as well as leadership and professional development more generally. These experts continually support the work of the ILC members, sharing their knowledge of CCSS- and NGSS-aligned instructional strategies that can help educators deepen student learning and build relationships with key stakeholders, including district administrations, county offices of education, local unions, and funding sources. The ILC facilitated encounters among teacher leaders and school and district administrators that led to collaboration and co-planning, thereby creating a support network. The partner organizations maintain a resource repository and collect data for project development.

In designing and implementing the project, the ILC conducted a range of activities, including identifying accomplished educators and providing them with the support to build ILC teams, offering professional development to team members, and organizing large statewide and regional conferences and presentations such as the “Learning from the Field” conferences in Phase 1 of the project and “Sustaining ILC Work in the Field” in Phase 2. These conferences featured workshops led by ILC teacher leaders for their colleagues, in which they shared their learnings on how to build effective partnerships—both within ILC teams and between ILC teams and key stakeholders, local teachers associations, and districts in both urban and rural contexts—and on how ILC professional learning activities could take root in the local communities. This included sessions on how to align ILC professional learning to districts’ Local Control and Accountability Plans, and how to build a culture of instructional leadership. Deepening ILC teacher leaders’ own knowledge of the new standards and assessments was an important part of the agenda.

ILC teacher leaders were supported to lead professional development workshops by the three organizing institutions of the project. The statewide and regional conferences not only provided them with training in leading professional learning and building relationships, but also with time to collaborate in teams and to plan for the specific professional learning needs in their districts. In general, participants reported high levels of satisfaction with events offered by the project. For example, 95% of the 103 participating ILC leaders at the 2016 Summer Regional Conference and 90% of the 173 participants at the 2017 Summer Conference found the event “very valuable” or “extremely valuable.” The following are some comments from participants:

Appreciate the time to plan and collaborate with colleagues. Thankful for the opportunity to network and share ideas/plans with others.

This was a very informative and valuable conference. I learned a lot being a new ILC member. We had the opportunity to build more relationships and learn from other ILC members.

Collaboration time within our region 2 was most helpful (both among our team and then sharing and receiving from other teams). Workshops: strengths-based, innovating, and exciting. Science was clarifying and helpful.

Further regional breakout sessions convened teacher leaders to discuss challenges they faced in their district contexts and share strategies for planning. The central project team convened various stakeholders and facilitated communication among them. This team continues to provide sustained technical assistance; it curates instructional resources and tools and maintains an ever-growing database for documentation and project development. Building on this knowledge, ILC teacher leaders conduct their own in-district, sustainable professional development to advance instructional capacity.

ILC leaders focus on activities designed to build and enhance teaching capacity in three core areas:

1. The California Common Core State Standards (CCSS), the Next Generation Science Standards (NGSS), and the accompanying assessments.
2. Pedagogy required to respond to the standards and thus ensure that all students are successful.
3. School- and district-based professional leadership activities that enhance, spread, and sustain the work of the ILC.

### **Professional Development Workshops (PDWs)**

A hallmark of the ILC project is the Professional Development Workshops (PDWs). In these workshops, the teacher leaders put into practice principles of effective professional learning by supporting teachers as they develop knowledge and skills recursively and continuously in collaborative communities of practice.<sup>20</sup> Providing multiple learning sessions separated by opportunities for teachers to design and apply new strategies in their classrooms is a key element to helping teachers make lasting changes in instructional practice. This stands in contrast to single-session workshops, after which teachers may return to more familiar practices. Doing this work in collaborative teams increases the odds that teachers will be willing to attempt new approaches to instruction and to refine them with feedback and practice.<sup>21</sup>

In the first of two consecutive workshops, participants experience—rather than just observe—instructional strategies designed to deepen student learning. Focusing on an instructional shift represented by the standards in their subject area, they study a concrete example of when this occurs (often with videotapes of practice). Then they consider their own students and collaboratively plan their own lessons to address this shift. They connect their professional learning to practice, paying attention to evidence of student learning. (See Appendix B.)

During the second workshop, participants analyze artifacts or samples of their students' work, discuss and reflect upon what they learned, and provide and receive feedback from colleagues for iterative improvement of teaching practice. At times, in subsequent sessions, ILC teams continue working with the same group of colleagues for longer periods of time to go deeper on topics of interest.

Most workshops initially focused on the instructional shifts associated with the CCSS in English language arts and mathematics, and later on shifts associated with the NGSS. Workshops took place primarily at district and school levels, but also at county and regional or state levels. According to an earlier evaluation report,<sup>22</sup> greater awareness of standards, improved instructional practice, increased student learning, and empowered leaders were among the impacts of the project in this first phase.

Currently, the ILC is in Phase 2 of the project, which will continue until June 2020. Extending the name of the enterprise to “educators educating educators,” the primary goal of this second phase is to expand to more districts throughout California and ensure that the practices take root in local communities by deepening partnerships and by garnering resources for sustaining its activities. As defined by the ILC, the project is taking root if and when the local community

- increases fiscal commitment to the work;
- embraces and spreads the ILC work; and
- values ongoing teaching and learning as well as the knowledge and the expertise of teachers/practitioners in facilitating professional learning.

Local stakeholders work together to meet professional learning needs of educators, and ILC members deepen their own professional knowledge and skills in locations in which partnerships are functioning effectively and professional learning is deeply embedded, spreading from school to district and even to state level.

## **Systemic Educational Change and the ILC**

International research underscores the importance of teacher professional collaboration. A survey of more than 100,000 teachers from 37 countries and jurisdictions found that when teachers have more frequent opportunities to collaborate, they are more likely to have confidence in their ability to manage a class, provide high-quality instruction, and engage students in learning.<sup>23</sup> The same study found that teacher collaboration and feedback, including peer mentoring and coaching, was associated with greater job satisfaction and the use of the more active teaching practices that can engage students in project-based and technology-supported learning.

ILC teacher leaders and site leaders take a systemic approach by engaging both in teacher-to-teacher collaboration and in cross-role collaborations. They seek teachers to plan and work together and institutional partnerships that align with local initiatives and funding sources. The ILC's theory of action resonates with Jaquith's framework for enhancing instructional capacity.<sup>24</sup> She argues that to provide high-quality instruction, districts and schools need to create opportunities for the development of professional knowledge, provide resources and materials, recognize instructional expertise, and build organizational structures that support teacher collaboration and trusting relationships. In connecting both individual teachers and school organizations, the design of the ILC mitigates against the professional isolation that can inhibit educational improvement efforts.<sup>25</sup>

In connecting both individual teachers and school organizations, the design of the ILC mitigates against the professional isolation that can inhibit educational improvement efforts.

## The Instructional Leadership Corps in Action

Harnessing and further developing teacher leadership is a key intention of the ILC project. Although teacher leadership is a variably defined term in educational literature,<sup>26</sup> we use the term to refer to the many informal responsibilities that teachers take on in addition to their formally assigned roles and duties. These responsibilities can include sharing professional knowledge and pedagogical practices, building collegial networks in ways that support the professional learning of colleagues, and contributing to the development of collaborative professional cultures in schools.<sup>27</sup>

We investigated the work of ILC teacher leaders at four sites across California. In some cases, given their understanding of the students' learning needs, ILC leaders were able to align their activities with school and district improvement goals. Through these efforts they were able to boost their capacity to make instructional choices and enhance their "decisional capital."<sup>28</sup> In doing so, teacher leadership can be regarded as an approach to a systemic educational reform sometimes known as "leading from the middle," in which teachers and professional collaboration are centered as drivers of change.<sup>29</sup>

Among the tenets of the ILC is providing professional development designed to be responsive to the specific needs of the local district and offering workshops led by local teacher leaders who have expertise and have earned the respect of their colleagues. These local leaders are familiar with the policies and the politics, the financial conditions, and the labor relations in the district. At the sites we studied, teachers deepened their knowledge of the newly introduced state standards and assessments, as well as the related instructional tools and strategies to support student learning. ILC team members assumed leadership roles, garnered resources, and forged partnerships within and across districts, with county offices of education, and with universities.

In this section, we first highlight the ways ILC leaders attended to developing their colleagues' understanding of the standards and the new assessments based on the identified needs of each district. Next, we consider the impact the teacher-led workshops had on teacher learning and on

student engagement in the classrooms of teachers who participated in these workshops. Third, we describe how development of teacher professionalism and leadership capacity as a consequence of the teachers' engagement with the ILC has been one of the many beneficial outcomes of the work of the ILC and a necessary condition for systemic change.

## **Madera Unified School District**

Madera is a small town of around 64,000 in rural San Joaquin Valley. Its population has doubled since 1990, growing by more than 40% just since 2000. Starting in 2008, the economic recession caused layoffs in teaching staff, mirroring the experience of districts statewide. Since the end of the Great Recession and the economic rebound, demand for hiring has increased, yet the sharp statewide decline in teacher education enrollments has not yet rebounded.<sup>30</sup> Like many districts, meeting the demand for teachers required hiring many novice teachers. In Madera, teacher turnover is compounded because many teachers live outside the district and subsequently seek employment closer to home. As of 2017, Madera Unified School District serves close to 21,000 students. Over 10% of the approximately 1,000 teachers in the district have 2 years or less of teaching experience, and nearly 7% of teachers hold a temporary teaching credential.<sup>31</sup>

As in many rural districts in California's Central Valley, a large proportion of the student population lives in poverty, and many students enter school—and some exit school—classified as English learners. In Madera USD, the proportion of students eligible for free and reduced-price meals is close to 90%, 31% of the students are classified as current English learners, and 28% are identified as fluent-English-proficient. Among English learners, Spanish is the primary language of the majority of students, and around 89% of students in Madera Unified School District are of Hispanic or Latino/a heritage.

Teachers in Madera indicated that language development was an issue not just for English learners, but for all students. Around 32% of students in the district were meeting or exceeding state standards in English language arts in 2017, compared to 49% statewide.<sup>32</sup> Language and literacy development across content areas has thus been a key educational aim in Madera USD.

### **Supporting language development**

The Madera ILC team realized that in addition to a significant proportion of designated English learners, some of whom were new immigrants and might never have attended school before, the majority of the district's students needed to be able to develop subject-specific discourse in all school subjects. To be successful in following the new curricula and demonstrating what they learned on the new assessments, students needed to develop their oral and written proficiency in English, the language of instruction.

Thus, the ILC leaders embarked on a professional learning program for teachers to help develop and support students' academic language competencies. They put together the key elements in fostering academic language, including classroom norms for productive discussion, and sentence frames to help scaffold academic conversation. Sentence frames are widely used. These are formal sentence structures (e.g., "I agree with X that ...," "Based on my experience, it seems that ...," "If I understood you correctly, your opinion/suggestion is that ...") that include high-incidence vocabulary (e.g., "analyze," "benefit," "principle," "major"), for specific disciplinary discourse in academic settings. The workshop materials included examples of sentence frames and sentence starters. (See Appendix C for examples of resource materials used at the workshops.)

## A focus on arguing from evidence

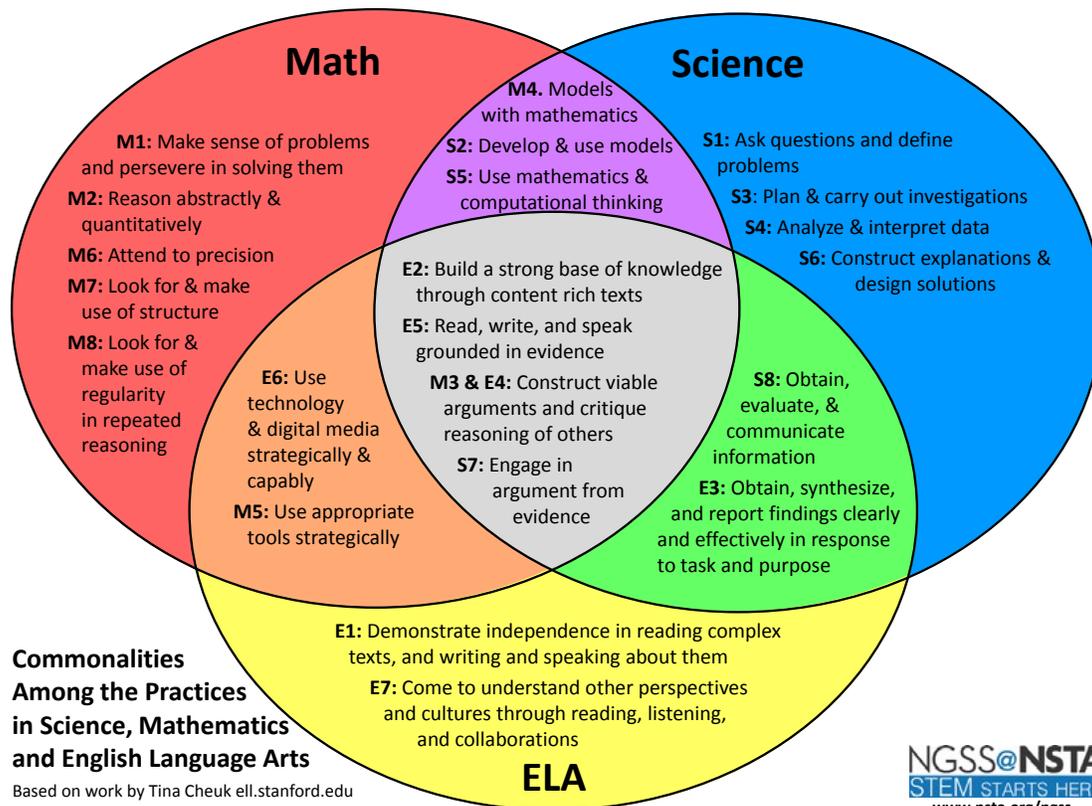
The process of determining areas of focus for the professional learning workshops began with an examination of the discipline-specific practices in the new standards and a serious consideration of both student and teacher learning needs in Madera USD. Seeking to leverage their strengths in different subject areas (mathematics, science, literacy), the team looked at the commonalities among the standards and even areas of overlap. Initially, they settled on “evidence-based reasoning and argumentation.” As the science teacher in the team explained:

There is a three-circle Venn diagram. We looked at that thing and said, “So I’m a science teacher, he’s a math teacher. What can we do together for all our teachers? There, in the sweet spot, is arguing from evidence.

The teacher leaders also knew that there were foundational knowledge and skills that students needed to develop and that teachers needed to incorporate into their teaching repertoire. They also knew that this would require some backward mapping. As the ILC leader noted:

If we want the kids arguing from evidence in May, what do they have to do in September? We said, “They have to just be able to talk to each other at an academic level. We’ve got to raise that level of discourse.”

**Figure 2**  
**Commonalities Among the Practices in CCSS and NGSS**



Source: National Science Teachers Association, <https://ngss.nsta.org>.

And she added:

Our big goal was communicating that whatever you're teaching can go to every single subject if you're teaching the language first. And then the content is almost secondary. Because if they can't ... articulate what they're talking about, the content will never take shape.

In “Academic Talk in Madera” we describe a workshop, one of the two-part workshops on emphasizing academic talk across all subject areas and grade levels. The two 3-hour workshops were offered about 2 weeks apart, during after-school hours at one of the elementary schools in the district.

### **Academic Talk in Madera**

With close to 40 teachers attending, two parallel sessions were held in two separate rooms—one for elementary school teachers and one for secondary school teachers.

The session began with welcoming greetings by the presenter and short introductions by the participants, who stated their name, their school, and the subject they taught. After a few announcements about logistics (e.g., how to enroll to receive both professional development units through San Diego State University and a district-funded stipend), a teacher leader set the stage for the day's activities.

The workshop leaders distributed task cards and resources. Teachers engaged in discussion, proposed ideas, and exchanged experiences of CCSS-aligned instruction. The teacher leaders then used slides and short videos to introduce strategies for giving students more opportunities to participate and talk in class to develop their language skills. Providing talk time for the attending teachers, they modeled these strategies. As one teacher leader noted: “The person doing the talking is the one doing the learning.” Rather than asking the students to be quiet so the teacher could talk, students were to be actively engaged and interacting. This idea represented a significant shift in the district's approach to teaching and learning after over a decade of Explicit Direct Instruction, a highly scripted curriculum that had been implemented in the district.

After a short break for dinner provided by the Madera Unified Teachers Association, the local union body, the second part of the workshop involved a short, interactive presentation that built on the content of the first part of the workshop and another group activity. Teachers received materials on sentence frames for students to present an opinion, acknowledge ideas or seek clarification from a peer, or constructively disagree and make a suggestion. Teacher leaders showed how these structures could build across grades to foster more complex dialogue, from those in grades k-1 (“I think ..., because ...”) through to more advanced ones in grade 6 and beyond (“Based on ..., I infer that ...”).

Before the end of the workshop, and after a short debrief, the organizers urged the teachers to try out, as soon as possible, the instructional strategies presented and bring their lesson plans and student work samples to the second PDW, which would be scheduled shortly. They encouraged the teachers to send emails with questions, complete the homework in the shared Google Classroom that had been set up, share experiences, and visit each other's classrooms to help support these instructional shifts.

Between workshops, teachers engaged with each other to share and refine practices, and in a subsequent workshop, they reconvened to discuss what they had learned and to take up additional approaches for implementing the strategies.

## Deepening the work

To expand the teachers' repertoire in deepening students' learning, the ILC team extended its work to include discussion and activities on depth of knowledge and higher order questioning. This was seen by the ILC teacher leaders as a necessary step to move toward students being able to effectively develop arguments from evidence:

We really felt like we wanted to take the success of academic talk and embed that in the whole district's repertoire moving forward. We felt like we could make a justifiable case that collaborative groups, academic talk, higher order questioning, and arguing from evidence were four elements that all built upon one another.

The next step, in our conception of it, was get them in collaborative groups, learn how to do that, and get them into the academic talk. The teacher needs to understand how to move this group now that it is organized properly with higher order questions, and now we need to work on the argumentation from evidence, and that's not just verbal. That's got to be written too.

## Expanding the reach

As the team went deeper into the more complex aspects of the standards, it also sought to expand its reach. The academic talk workshops in the first year of the ILC at Madera had shown early and expansive success, having reached every middle school teacher in the district. In the second year of the project, the group resolved to use a training-the-trainers model to scale up the success they had had at the middle school level. This approach involved working with elementary and high school principals to raise awareness of the workshops and their potential to shape instructional practice aligned with the CCSS and NGSS, and to get buy-in from the schools.

The ILC team, now five members strong, established workshops for teacher leaders in each school in order to train them to lead the workshops in their own schools. By the end of the 2015–16 school year, the ILC team reported that its workshops had reached all 1,000 teachers in the district, and most school administrators. The team not only developed a training-of-trainers program to expand teacher leadership and the reach of the program, it also created a unit-bearing professional development course through a university. The team embedded the course as part of the induction training for all new teachers in the district. With several of these teacher leaders recently becoming school and district administrators, the Madera ILC team is well-positioned to support teachers who are intent on deepening their instructional practice.

## Conejo Valley Unified School District

Conejo Valley Unified School District is in Ventura County, about an hour north of Los Angeles. A medium-size district, as of 2017 it had approximately 19,000 students and 887 teachers in 16 elementary, one k–8, four middle, three comprehensive high, and two alternative high schools.<sup>35</sup> According to district documents, slightly over half of the student population is White, 25% of students identify as Hispanic or Latino/a, and close to 10% are of Asian heritage. Small percentages of students are multiracial, African American, Filipino, or Native American. About 10% of students are classified as English learners, about half the state's average. The population of students eligible for free and reduced-price lunch in 2016–17 was 21%, close to one third of the state's average.<sup>34</sup>

Conejo Valley is recognized as a high-achieving and well-resourced district. Building science competencies is of particular interest, reflecting the number of science- and technology-focused companies in the district. One of the district responses was the recent opening of science magnet schools. However, the new science standards initially took a back seat in the district's professional learning efforts.

In the early stages of CCSS implementation, the district benefited from an influx of state funds designated to support professional development efforts. With the support of those funds, around 350 workshops were offered to the teachers in the district in a single year to further the implementation of the CCSS in mathematics and English language arts. Until recently, less emphasis was placed on the implementation of the NGSS within the district; science teachers relied on professional development offered through the county office of education, which continues to play an important role. In moving forward with the implementation of the CCSS and later the NGSS, the district made a strategic decision to phase in the newly adopted standards and assessments first in elementary, then in middle, and then at the high school level.

### **Two approaches to professional development for inquiry-based science teaching**

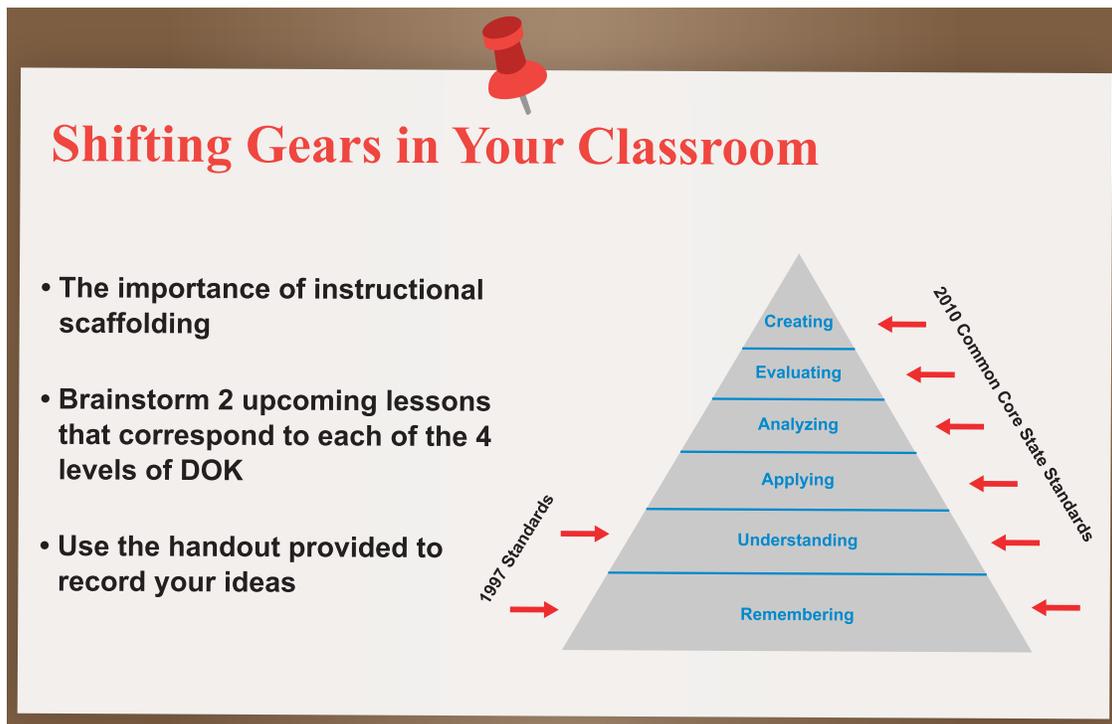
Strong community interest in science learning in Conejo Valley and the need for vertical alignment from elementary to high school dictated the work of the ILC leaders in this district, who were supported both by the district and the local teachers association (the Unified Association of Conejo Teachers). The two ILC teams adopted parallel but distinct strategies for building teacher capacity for NGSS-aligned instruction. One team worked closely with a small group of teachers at an elementary school, helping teachers to familiarize themselves with the NGSS. Another team developed a leveled series of workshops ranging from an introductory webinar presenting the basics of the NGSS, to establishing a professional learning community, thus providing different points of entry for teachers to NGSS pedagogy.

During the first year of the program, two experienced high school science teachers formed the initial Conejo Valley ILC team. The team expanded during the second and third year of the project, when three science teachers, a Teacher on Special Assignment and former vice principal, and a teacher from an elementary magnet school and member of the county's NGSS leadership team joined the project, even as one of the original members took a leave of absence. By the third year of the project, and with that original member returning to the ILC, two teams formed and conducted their activities in parallel, each focused on professional development in science and NGSS. The teams worked in coordination and were able to develop two distinct approaches to teacher professional learning.

One team developed a tiered approach to implementing NGSS, from an introductory webinar to supporting an expert and collaborative group of colleagues who shared lesson plans, curricular materials, and resources. The other team, consisting of two science teachers from the same high school, a middle school teacher, and an elementary school teacher, worked closely and intensively with a small group of elementary teachers. These teacher leaders worked with elementary school teachers and introduced them to grade-appropriate science concepts and practices from the NGSS, regularly co-planned and co-taught lessons, and discussed and reflected on their teaching together.

During the first year of the ILC project, the initial two members of the ILC team began their work by organizing a workshop titled “Shifting Gears to the Common Core.” Using some examples of relatively short classroom experiments (with easy-to-use materials such as water and food coloring), the presenters introduced the new science standards by invoking the already-familiar Core Curriculum standards. A discussion of the Bloom taxonomy and cognitive rigor matrices led to generating ideas about how teachers can deepen their instruction to push student thinking further. The presentation also outlined key features of the CCSS in English language arts and mathematics.

**Figure 3**  
**Slide from “Shifting Gears to the Common Core” Workshop**



Source: Conejo Valley ILC teacher-led workshop, 2015–16.

In designing the workshop, this team, like the Madera ILC team, followed the PDW guidelines recommended by the ILC. Participants had the opportunity to engage in a science activity and then worked with colleagues to develop a lesson plan. Next, participants reviewed each other’s lesson plans and identified the depth-of-knowledge levels addressed. Teachers offered feedback to their colleagues and suggestions on additional strategies for deepening and varying levels of complexity in the content of the lessons. Feedback from colleagues and from the workshop leaders was aligned with a strengths-based approach, asking teachers to identify and build upon work that had been successful and to push that work further.

## Expanding the reach of professional learning

The team members presented the workshop during three sessions with about a dozen attendees each. One of the team members folded these workshops focused on the NGSS into his existing work as an instructional coach and presented workshops at a union-organized professional development day. Together, the team delivered a version of the workshop to about 75 teachers at a county-led Beginning Teacher Support and Assessment (BTSA) induction event. This workshop also involved teachers conducting a science experiment that they could then replicate in their classrooms.

With one of the team members taking a year off from the project, the active ILC leader recruited colleagues and expanded the team. Responding to a need for a differentiated approach to professional learning, they developed a three-tiered model to offer varied opportunities for teachers to deepen their knowledge and boost their confidence as they progressed from awareness of the standards to observations of demonstration lessons, followed by participation and collaboration in expert groups. In one of the culminating activities, teachers could participate in a Summer Institute, in which they engaged in hands-on science activities and received science resource kits.

The first offering was a webinar open to all district teachers for professional development credit but mainly targeted toward teachers who needed to familiarize themselves with the new standards. One of the teacher leaders, a member of the district's NGSS rollout team, created the webinar in collaboration with all the members of the district's science committee. It consisted of a PowerPoint presentation accompanied by a voiceover. Teachers could click on a link and, after watching the presentation, respond to a short survey to demonstrate they had watched it. Teachers who completed this process received a certificate and district credit of half an hour of their annual professional development requirement. About 50 teachers watched the webinar. Given the collaborative process by which it had been designed, the webinar clearly reflected the district's priorities regarding the implementation of the NGSS.

Teachers who could verify their awareness of the NGSS standards either by having watched the webinar or by having participated in a district rollout event or in a conference were invited to participate in three PDWs offered after school to k–12 teachers. Each workshop was attended by 10–20 upper elementary and middle school teachers. Opening these workshops to elementary, middle school, and high school teachers was an intentional move designed to inspire multi-grade collaboration and to help teachers to gain perspective on learning progressions of disciplinary content and practice across grade levels. The focus of these workshops was on scientific modeling and on the use of interactive science notebooks.<sup>35</sup> Developing, using, and revising models to explain, explore, and predict phenomena is one of the performance expectations featured in the NGSS. During the workshops, participants had multiple opportunities to participate in hands-on science experiments and to practice scientific modeling.

In addition to these workshops, the team offered workshops open to teachers at all grade levels, with around 10–15 teachers attending each session. Unlike the workshops intended for teachers who were new to NGSS, these workshops were designed for teachers who were already implementing NGSS and who wanted the opportunity to share and collaborate with other teachers.

Participants' responses to the workshops generated interest and recognition from the district's administration that the workshops led by the ILC members had the potential to contribute to developing teachers' practice in science. ILC members also realized that additional guidance and support were needed, particularly for the elementary teachers. With financial support from

the district, and responding to the teachers' expressed interests, the ILC team decided to offer a 2-day Summer Institute in 2017, the first in a series of three such institutes. About 65–70 teachers attended these Summer Institutes, a substantive proportion of the elementary teachers in the district. Each participating teacher received a science kit that contained the necessary materials and resources for them to replicate the experiments in their own schools.

One of the ILC leaders offered an apt summary of this ILC team's work in Conejo Valley USD. She felt that it had moved the district and the teachers forward.

A lot more teachers are talking about science, emailing me and wanting materials, and asking questions, and just from that alone I know that they're eager and they're trying things; not just me sharing my knowledge and then it shuts down. I think by working with the district in tandem, and having our ILC PDs, along with what the district's science needs were, we're creating this whole system of "This is what you have to do, and here's more support." So [it's] a very beneficial way to utilize ILC.

### **Going deep in elementary science**

At the same time, the other ILC team was again becoming active in the district. Keeping in mind the original vision of the ILC project, this team set out to use their knowledge and experience with teaching science to support elementary school teachers in expanding their pedagogical repertoire to incorporate the NGSS. Like their colleagues, this team also used a three-stage approach in working with the elementary school colleagues: deepening familiarity with NGSS, offering lessons to demonstrate instruction that addresses the new standards, and co-planning and co-teaching science lessons with the teachers in the elementary school classrooms. To go deep rather than wide, the team created a pilot program designed to provide sustained and intensive support for teachers at one elementary school in the district.

Because two of the team members were also members of the county's NGSS leadership team, they deliberately and explicitly sought to align their pilot project with the county and district's efforts to roll out the new standards. A productive dialogue occurred between one of the ILC members and an official from the Ventura County Office of Education (VCOE), who was able to provide feedback on initial plans. A VCOE representative we spoke with expressed his appreciation for the ILC team's approach. He recognized the benefits of coordination, given the resources available at the county, the availability of data about areas of need, as well as information about in which districts and in which schools professional development could have a significant impact.

This educator also recognized the importance of providing not only single occasions for presenting content but also adequate infrastructure and ongoing support for the teachers. The ILC leaders also sought the advice of district officials. Members of the team met several times with district officials and presented their plan. District officials were supportive of the project and provided feedback that helped refine and sharpen the focus of the initial plans. They then selected an elementary school for their pilot project.

As a first step, the ILC team members conducted a short needs assessment survey with the k–2 teachers at the school. Ten teachers responded to questions about their comfort level with science, the frequency with which they taught science lessons, and their awareness and understanding of NGSS. The team found that the k–2 teachers at this school tended to complete science units by teaching three or four times per week, in alternate months. All respondents wanted more support

for teaching NGSS science and engineering practices. The survey also revealed that most teachers were unfamiliar with the engineering design process and with *5E* lesson planning, an instructional approach commonly used in science classrooms to support inquiry learning.<sup>36</sup> The ILC leaders aimed to be responsive to the teachers' expressed needs rather than impose an outside agenda.

I know that's funny to say, [but] our plan was "no plan." [We said] "Here's some topics our team feels like each one of us four team leaders could be experts on. So which of these would you like? Which of these would you find useful? Where are you starting and where do you want to end up?" And so it's really driven by their needs and what they were interested in.

The ILC teacher leaders listened, learned, and adapted their original plans as they moved forward. They adjusted their expectations about the level and frequency of interactions needed to increase the teachers' familiarity with the standards:

The first thing was introducing NGSS. We had a very basic presentation and we thought this would be no problem. And we realized very quickly that this was the first time many of them have heard these words, had heard these terms, these concepts, and it's really easy to forget how overwhelming it is once you've done this for so long. And so, we decided to take a step way back and break it down even to smaller parts.

So, we'd have a small little presentation about maybe the crosscutting concepts and then what this would look like in your classroom. And then disciplinary core ideas, alignment [with standards and grade levels]. [We] thought that would be a quick announcement, and little did we know, we spent the entire hour on that because that was shaking their world because they said, "Wait, I've always taught [for example] rocks. And now rocks are in a different grade. What am I going to do?"

One of the team members worked primarily with kindergarten teachers, another with 1st-grade teachers, and the two high school science teachers worked jointly with the 2nd-grade teachers. They met for relatively short sessions to allow time for the teachers to develop familiarity with the standards. The topics covered during these sessions were the NGSS standards; inquiry-based learning and engineering practices; and grade-level content maps as defined by the district. Resources for NGSS implementation were also covered, including the NGSS website itself; Better Lesson, with its rich menu of lesson plans; Engineering is Elementary; and Mystery Science.

The second phase of the project in early 2017 was joint planning for lessons to be taught by the two high school teachers in the elementary classrooms. Team members and teachers discussed lesson content, material resources, and classroom logistics. Subsequently, the two high school teachers modeled three science lessons: one in kindergarten, one in 1st grade, and one in 2nd grade. These lessons were built around content standards as well as science and engineering practices defined by NGSS. In the next phase, the two high school teacher leaders and an elementary teacher co-planned and co-taught lessons in an elementary classroom (see the discussion on p. 38, "Vertical Collaboration in Action: Co-teaching in Conejo Valley").

## Instructional Leadership Corps taking root in Conejo Valley USD

After a presence of more than 3 years, the ILC project has taken root in Conejo Valley USD. ILC leaders, as well as the district teachers and administrators, invested much effort, time, and considerable financial resources in the work of the ILC teams. District officials regarded the ILC workshops as a valuable complement to professional learning, providing stipends to teacher leaders and allowing participating teachers to credit attendance hours toward their quota of 12 professional learning hours annually required as part of teacher contracts. Moreover, the teachers with whom we spoke appreciated that professional development activities were led by teacher leaders who were from the same district. As such, they were familiar with the district, its policies, its priorities and politics, and its affordances and challenges.

The ILC teams received financial support from the district administration and schedule adjustments and workshop space from school administrators and the Ventura County Office of Education. This allowed the teams to make important contributions to district teachers' knowledge of the elements and significance of the new science standards as presented in the NGSS framework. Through the ILC-led workshops, now an integrated part of professional learning in the district, many teachers understood that students learn science by doing science. By participating in the teacher-led experiential workshops and through continued collegial interactions, teachers came to see more clearly the connections among crosscutting concepts, disciplinary core ideas, and science and engineering practices. They could also realize how these three dimensions are combined to form expectations for student learning; i.e., the standards.

A Teacher on Special Assignment whose contributions were critical to the work of both ILC teams recognized the importance of the ILC project as a continuation of the district's earlier professional development work that had been scaled back as funding for those activities was reduced.

In one year we had 350 workshops when we were funded by Common Core. Now that we're funded in the way we're funded now,... if we offered 30 workshops, that's a lot.... So our district went from a huge structure of teachers providing teachers with professional development, to practically nothing comparatively.... The ILC when we first started was like a little drop in the bucket; now it's one of the few [examples] of teachers providing teachers with professional development that is sustaining and ongoing.

The principal of the elementary school whose teachers worked with the ILC leaders appreciated the consistency of the collaboration among the teachers from the different grade levels—a necessary condition for bringing about the anticipated instructional shift. She also noticed the difference between ILC and traditional workshops. In the ILC workshops, teachers are working together on how to put good ideas into practice in their classrooms.

The benefits of collegial collaboration and teacher-led professional development activities, as well as opportunities for sustained follow-up, were recognized by district administrators as well. A district representative recognized the prospect of vertical alignment through the work of the ILC teams. She appreciated the fact that teacher-led professional development was based

In the ILC workshops, teachers are working together on how to put good ideas into practice in their classrooms.

on ongoing collaboration rather than isolated events; k–12 articulation; and integration of practices such as modeling, co-teaching, and reflecting together.

In a recent email exchange, one of the ILC teacher leaders who worked with the elementary school teachers informed us that she and her colleague made a presentation to the superintendent, the assistant superintendent, and the high school and elementary school principals about the successes of their work. The two ILC teacher leaders also shared their desire and a concrete plan to create a NGSS Mentor Team of six high school science teachers to serve as mentors to at least two elementary schools in the district. The newly appointed superintendent approved the program and included it in the Local Control and Accountability Plan. As she shared this news, she also wrote: “I wanted to share this advancement in district support to further solidify the concept of teachers helping teachers is the most effective strategy to initiate change and improvement in our instructional practices.”

### **The East Side Alliance (ESA)**

Situated in East San Jose, the East Side Alliance (ESA) is a formal partnership between East Side Union High School District and its seven k–8 feeder districts. ESA serves around 82,000 students in East Side Union High School District’s 29 traditional, alternative, charter, and adult education schools, as well as students in dozens of elementary and middle schools in seven k–8 feeder districts: Alum Rock, Mount Pleasant, and Oak Grove among them. Partner organizations include the Silicon Valley Education Foundation and other philanthropic organizations, corporations, and two higher education institutions.<sup>37</sup>

The multidistrict Alliance is disparate and diverse. Reflecting residential patterns, student demographics vary among the schools in the high school district and among the k–8 districts. For example, the proportion of students who qualify for free or reduced-price lunch at Evergreen Valley High is 16%, while at James Lick High School it is 82%. In the Alum Rock Union Elementary District, 92% of students speak a language other than English in their homes and 44% are classified as English learners. In the Evergreen Elementary district, 23% are so classified.

The ESA aims to improve student learning outcomes, high school preparedness, and college and career readiness. First among the ESA’s goals is to increase the number of students who successfully complete 8th-grade algebra and at least two math courses in high school, thereby increasing the number of students completing graduation requirements. Additional goals of the ESA include increasing the number of students enrolled and succeeding in calculus as well as in other advanced placement courses. Importantly, the Alliance set as its goal to accelerate the completion of A–G graduation requirements of Latino/a students, African American students, and English learners.

At this site, we investigated the work of two ILC teams: one in the Mount Pleasant Elementary School District and another in the Alum Rock Union Elementary School District, each of which serves a significant population of students from low-income families, including many English learners. Both teams led a series of workshops on how to incorporate mathematical practices and formative assessment in everyday classroom instruction.

In a second tier of workshops, the Alum Rock team introduced *lesson study*, in which a group of teachers collaborate to plan, teach, observe, revise, and examine results of a single lesson. One of the goals of lesson study is to foster teachers’ observation and feedback skills to further build

instructional capacity. The coordinator of mathematics education in the county office, a former local high school mathematics teacher, was a member of both teams. She and members of the Mount Pleasant team organized and led several large-scale events for high school and middle school mathematics teachers from districts within the Alliance. The strong relationship between the county office and the ILC teams offered resources and standards-aligned curricula for the district-level workshops. An important outcome of the activities of the Alum Rock ILC team was improved communication between the union and the district administration in a district with historically fraught labor relations.

### **Focus on mathematical practices and vertical alignment**

The ESA offers three kinds of professional learning events for mathematics teachers: conducting large-scale math symposia for mathematics teachers from all member districts, attended by about 100 teachers; building professional learning communities for high school and middle school mathematics teachers; and convening upper elementary school (grades 3–5) teachers to learn together.

In this environment of frequent and relatively large-scale professional learning opportunities for teachers of mathematics as well as teachers of elementary grades in the ESA, members of two ILC teams planned and delivered workshops and other learning opportunities for teachers in their home districts. In response to the primary goal of the ESA, both ILC teams focused their efforts on the implementation of the new standards and assessments in mathematics. One team presented at the large-scale symposia open to all mathematics teachers in the Alliance, and at the smaller scale, cross-grade collaboratives organized by the Alliance to partner middle school mathematics teachers with their counterparts from the high schools into which their students would graduate. This team also organized numerous workshops and meetings of professional learning communities for elementary and middle school teachers to go deeper on topics and strategies introduced at the larger events. A county administrator estimated that the ILC team reached 50–60% of the ESA's middle and high school mathematics teachers with the math symposia and collaboratives over the past 2 years.

During these collaborative professional learning events, teachers were able to probe more deeply into themes raised during the symposia, and develop a common language for discussing mathematics content, instructional practices, and assessment—particularly formative assessment—thereby strengthening vertical articulation between the high schools and the feeder k–8 schools. In 2015–16, the team led four cohorts of mathematics teachers in a two-session workshop series, reaching about 80 teachers.

One of the ILC leaders explained that greater vertical articulation, i.e., alignment of courses and instructional practices across grade levels, was needed to help middle school teachers support their students' transition to high schools. For example, as James Lick High School was adopting the New Tech program, it began to place emphasis on interdisciplinary classes and project-based learning, in which students work in small groups on real-world projects for 6–8 weeks and present their work to a panel of community members. As many different feeder districts feed into one high school district, if districts are not aligned in terms of content, skills, and practices, then students will arrive to the high schools with widely varying experiences and skills sets. An abrupt transition from middle grades to high school could definitely impede students' potential for success.

The need for vertical alignment and opportunities for teachers to have continuous conversations was further increased by the adoption of new Common Core-aligned mathematics textbooks in the different districts. Thinking across grade levels by linking major mathematical topics and concepts, by developing procedural skills and fluency, and by emphasizing real-world applications consistently and coherently is essential to support the progression of student understanding as students move from grade to grade and from district to district.

The formal inception of the ILC team provided a mechanism to further extend the team's work on two levels. One of the team members drew on key themes they had explored together, formative assessment among them. She also presented at numerous large venues, such as the CTA's "Good Teaching" conferences. Together, the team led professional development workshops at their own school sites and conducted two sessions on formative assessment for 41 staff members at Orchard Elementary School District, representing nearly all district staff, and including k–8 teachers, administrators, psychologists, a resource specialist, and special education teachers. Focusing on formative assessment, a practice of great value for student learning, the team was able to be responsive to both teachers' and administrators' expectations for using formative assessment in mathematics and across other subject areas.

The members of the ILC team also ran three PDWs, for a total of six sessions for each of the grade k–2, 3–5, and 6–8 teachers in Mount Pleasant, the home district of one of the team members. Focusing on formative assessments, e.g., collecting information about students' level of comprehension, learning needs, or progress during a lesson or a unit, they introduced clickers to collect, record, and display students' responses in real time, among other tools. Close to 75% of the teachers in the district participated in these workshops. Between the middle school and high school professional learning communities and the extended work in Orchard and Mount Pleasant districts, this team reached nearly 250 teachers with multiple workshops from October 2015 to January 2016.

A middle school teacher who participated in these collaborative meetings described what and how she was able to learn through the varied activities and the different topics covered:

Every meeting had a different focus. So, some meetings were focused around collaborating with high school and junior high teachers. What do we as junior high teachers have to do in order to help our students get prepared for high school? They would show us a lot of statistics and why we as a team need to collaborate and use different strategies like formative assessments. And we also focus on the SBAC [Smarter Balanced Assessment Consortium] questioning a lot with the East Side Alliance.<sup>38</sup> And it just gave us a better idea of what the state is looking for as far as the answers to the type of questions [that are] going to be on the CAASPP test and then the answers that they're expecting and how to move from there. At other workshops they would try different math games and math strategies with us in order for us to learn how to really think differently and help our students to think more creatively.

The ILC leader from Mount Pleasant extended the work of the high school/middle school PLCs by organizing a series of mathematics-focused professional development workshops through Moonlight University (a name chosen because the workshops were held in afternoons and evenings) in Mount Pleasant, her home district. Moonlight University provides targeted professional learning

opportunities to support CCSS in mathematics and NGSS implementation, as well as programs in English language development and use of technology in the classroom.

The ILC leader has been organizing and delivering workshops for mathematics teachers from two schools in the district. She emphasized that each Moonlight University session was designed to respond to teachers' present learning needs while drawing on the content of the symposia and of the collaboratives. Her forethought and flexibility in scheduling the workshops by sending out Doodle polls to find times that worked for most was recognized and appreciated by the teachers. One participant noted: "If she didn't do that, it probably wouldn't work, because everyone is so involved in different committees and everything in school."

How to conduct *number talks* was a frequent topic in these sessions. Number talks<sup>39</sup> is a highly recommended and widely used classroom routine designed to support students' sense of numbers and operations as well as ways of communicating about mathematics in the classroom. In a number talk the teacher poses a math problem and gives students a few minutes to think and reflect on different approaches they might use to solve the problem. They may use a designated hand signal to indicate when they have come up with one or more solutions and are ready to share. With the teacher as facilitator, students then share aloud with the class and discuss the different ways they approached the problem and the steps they used. In doing so, students can learn from their peers and, by focusing on mathematics reasoning over finding "the" answer, build a richer mathematical understanding.

Strategies such as number talks offer several other advantages. They give students practice in articulating their mathematical thinking using their own words. In districts with high proportions of English learners, these are valuable additional opportunities for students to use language in context and develop their mathematics vocabulary. Further, by validating multiple approaches to solving a problem, this approach can reduce mathematics anxiety and encourage participation.

### **Determined to learn and lead**

Members of the ILC team in the Alum Rock District provided professional learning for teachers in one of the neediest and most tension-fraught districts within the ESA. Alum Rock serves close to 11,000 students in its 14 elementary schools, seven middle schools, and three k-8 schools. In this district, the proportion of students who qualify for free and reduced-price meals is over 85%. The district reports 42 different languages spoken in the homes of its students. Close to 45% of the student population is classified as English learners, and nearly 40% of all students report Spanish as their home language.<sup>40</sup> Student enrollment in the district has declined steadily, about 13% during the past 7 years. Since 2012, the number of charter schools and student enrollment in charter schools more than doubled.

Over the years, local newspapers reported periodically about considerable turbulence, financial irregularities, and lack of stability, with frequent changes in the position of district superintendents.<sup>41</sup> The district also experienced high teacher turnover, a further potential impediment to sustained student progress. While recognizing veteran teachers' considerable expertise in the fundamentals of teaching and knowledge of their teaching context as significant assets for the district, a district representative noted two major concerns: recruiting highly qualified teachers to replace those leaving and the need for continuous professional learning required of both novice and veteran teachers by the implementation of the CCSS.

This ILC team began leading professional development workshops in early 2015; the work continued with considerable support from the county office mathematics coordinator, who became a team member of both ILC teams in the ESA. Members of the team began their work with PDWs at their own school sites and reached out to parent and community groups to share information and garner support. Based on an agreement between the district and the local educators' association, and using funds available under the Local Control Funding Formula, teachers were able to receive an hourly wage for attending the workshops. With this monetary incentive, attendance at the early workshops was between 75 and 90 teachers, a respectable number.

One of the ILC leaders recognized that while professional learning in the district had provided opportunities to orient teachers to the new curriculum and the new standards, there was limited follow-up. Consequently, as another team member noted, because many teachers were not ready for the change, they reverted to direct instruction. A different approach to professional learning was needed.

A six-workshop series in 2016–17 was the response. The workshops, offered to 25–30 teachers in grades kindergarten to 5, focused on the Standards of Mathematical Practice (SMPs)<sup>42</sup>—the mathematical reasoning processes, understandings, proficiencies, and dispositions that teachers should seek to develop in their students—and on how to integrate these with the CCSS content standards. Two mathematical practice standards were addressed in each session, together with strategies to promote them in the classroom. In accordance with the ILC's strategy of using two or more PDWs to foster instructional shifts, an ILC leader described the series as follows:

In our first session we did an overview and then we worked on Standard for Mathematical Practice One and Six because those are the overarching [ones]. They pretty much tie in every math lesson you're doing. [They] focused on one or two strategies for teachers to try out in their class, focus on the SMPs, and then come back. Then about a month later we met again, and we always started with a check-in with "how did it go, what did you work on, what was successful, what did you try?" And then we would focus on two more SMPs and some new strategies that tied in with the SMPs a little more, and then gave them time to plan and prepare to take it back to their classroom. So that was the basic structure for the first four sessions.

The PDWs taught specific pedagogical skills, including activities, games, and assessments. One such example was *spider math*, a math game in which spider webs are used to model operations with integers. The *three-act lesson* was introduced at another workshop.<sup>43</sup> In Act One, students are shown an image of a video that depicts an interesting situation to pique their curiosity. In Act Two, students ask a mathematical question related to what they saw, formulate questions, and gather information needed to answer those questions. In Act Three, students construct mathematical models of the situation and compare their models to the real world. The three-act lesson served as a framework for folding in other tools, such as *number lines* and *number webs*, recognizing geometric patterns, and designing charts. As with Moonlight University, number talk became a core strategy. It promoted a dual purpose: conceptual understanding of mathematics and the development of disciplinary discourse, a particularly urgent need given the large number of English learners in the district.

Each session was designed to provide opportunities for teachers to learn with and from each other and gain multiple perspectives on teaching strategies. These included pairs, table groups, and grouping by grade level, allowing teachers to share experiences and strategies across schools and grades. Between sessions, teachers were encouraged to try out the strategies and continue to work with each other on problem solving and fine-tuning. During the last session of the series, participating teachers reflected on their experiences implementing the newly learned strategies, shared samples of student work, and reflected on what went well and what changes they needed to make for next time.

The workshops that focused on the mathematical practices were successful, and the feedback from participating teachers was positive. As a result, the team was asked to continue its work in two ways: to offer a second series of workshops focused on formative assessment and to contribute to the workshops offered during dedicated professional development days. In June 2017, two ILC teacher leaders led a daylong version of the mathematical practices series for the district. A third ILC member led a session on the NGSS for elementary teachers, attended by around 65 teachers. A second whole-day mathematical practices workshop was held in August 2017.

The work of the ILC team in the district demonstrated the value inherent in collegial support and targeted collaboration. Two teachers who had participated in the workshops took on a new role as instructional coaches, one with the district and another at her school site. The instructional coach at the school site indicated that she relied on her experience at the workshops as she was planning the content and the use of resources in her new position. Because she and her colleagues had attended the workshops together, their present collaboration was an organic development of trusting collegial relationships.

The success of the workshops and the growing positive relationship with the district led to sustained activities by members of this team. Workshops focusing on supporting students in enacting the mathematical practices laid out in the CCSS continued to be offered during the 2017–18 school year. Teachers who had completed the series during the previous year asked for additional workshops. The ILC team responded by offering a Year 2 series of workshops focusing on lesson study. The proclaimed goal of these workshops is to urge teachers to observe colleagues' classes, provide feedback, and continue to further develop each other's instructional practice. When one of the ILC leaders became a site-based instructional coach she was able to expand the professional learning opportunities to more district teachers. She established mathematics-focused PLCs at two schools, with 24 and 15 teachers enrolled, respectively.

While the professional learning opportunities offered by ILC leaders were highly beneficial and much appreciated by their colleagues, calendaring and logistics were a challenge for the Alum Rock team and several of the other ILC teams. Professional learning workshops needed to be scheduled around many competing events and activities to make it feasible for teachers to attend. Such activities included other professional learning workshops offered by district offices and local teacher associations, as well as school or teacher association meetings during after-school hours. This challenge was lessened in areas in which teams were able to get the workshops included in district calendars, such as in Alum Rock, or to have their own classes covered by substitute teachers to facilitate collaboration. To address this challenge, recognition and support from district and school administrators were needed and appreciated by ILC teacher leaders. In Alum Rock, Conejo Valley, and for the Madera induction workshops, ILC professional development was fully integrated, effectively removing a distinction between ILC workshops and those offered by the district.

The county officer and the two ILC members from Mount Pleasant and Oak Grove districts had been working together on organizing professional learning activities under the auspices of the Alliance before formally joining the ILC in the project's second year. Relying on the positive reputation, the professional resources, and the support of the statewide ILC, this team was able to expand and deepen the work in which they had been engaging previously. The county officer's active involvement with both teams had many positive consequences. She made productive connections and participated actively in their workshops. As a former teacher herself, she facilitated and supported both teams in the essence of the Instructional Leadership Corps: *teachers teaching teachers*.

### **North Orange County / Fullerton**

The fourth team in the study formed in a way quite distinct from the others, becoming less tied to activities within its specific districts, and instead able to work effectively across districts to achieve expanded aims. Initially, ILC members in CTA's Region IV were organized in teams by three geographic areas: Orange County, San Diego, and Riverside. They made numerous attempts to organize professional learning opportunities for their colleagues in their immediate settings. However, over time, the teams had varying, and for some, somewhat discouraging, experiences. While some districts appreciated the ideas proposed by the ILC members, many were not ready to support teacher-led professional development and continued to invite "outsiders."

Ultimately, ILC teacher leaders of Fullerton Joint Union High school district decided to expand their purview beyond engaging in professional development that attended to the specific needs of their local context. A Fullerton-based team of teacher leaders used ILC state and regional conferences to assemble a network of colleagues from districts across CTA's Region IV, including several from Orange County, Riverside, and Temecula.

This network within a network drew upon the diverse expertise of its members to provide professional development across a broad range of Common Core-aligned strategies. In close and productive partnership with the Center for Careers in Teaching (CCT) at California State University Fullerton, they developed a series of biannual conferences. Now in the fifth year of this network's activities, the "Teachers Teaching Teachers" (TTT) conferences bring together around 100 educators and pre-service teachers for professional learning sessions and collegial networking.

Around 20 ILC teacher leaders in the network serve as conference presenters to the educators and teacher candidates present. Many of these teacher leaders also conduct professional development workshops in their own districts. Presenters lead professional learning sessions at the conferences, addressing useful strategies and tools for the implementation of the new standards and assessments.

### **Strengthening and diversifying the profession**

This innovative approach was initially the result of difficulties that ILC teams had in persuading their districts to fully use their talents in structuring professional learning for other teachers. One ILC member felt that administrators in her district held limiting views of the teacher role: These included the views that teachers should focus on teaching, and keeping with the status quo, that

consultants should be hired to deliver professional development or to hold internal training for Teachers on Special Assignment who would then train teachers. As a result of these views, the ILC member felt she was unable to persuade administrators of the value of experienced teachers contributing to the professional learning of their colleagues.

Another ILC member noted that although she had an amicable relationship with her district administrators, she had difficulty coordinating the logistics of offering PDWs in her district. As a result, she chose to offer early PDWs out of her local union office. She recognized this situation had a dual advantage of demonstrating their colleagues' expertise and the role of the union in supporting teacher learning. She said:

I have a relationship with the curriculum coordinator for the district. So there have been times when I've said, "I want to do a training after school where you pay people." [The coordinator replied] "Absolutely, but it's really hard because there's so much going on at our district office that to get a time slot to do that is difficult." So I [said], "Let's bring that back, and let's try to run trainings through the union instead," which was twofold for me: (1) to get teachers to understand that your fellow colleagues have skills and expertise in an area that they can train you in, [and] (2) to help them see the union is [about] more than just bargaining your contract, there's more to offer and more support that we can give you than just that. That was important for me.

A third ILC member said that the level of engagement had varied with different district administrations. Although the ILC had gained traction recently, he noted how earlier district staff had unfortunately perceived ILC workshops as competing with district efforts.

ILC members from the Fullerton district said that while the district seemed receptive, the pace of its response was slower than the ILC team preferred. For example, they noted that ideas on growth mindset teacher leaders had encountered at ILC conferences eventually filtered to the district level through their personal relationships with administrators. Although the district seemed increasingly open to newer ideas, ILC members were not given opportunities to host professional development workshops.

Faced with these uneven uptakes and insufficient engagement from their home districts, several ILC members began to look for alternative venues to collaborate and offer professional learning opportunities to their colleagues. Several of these teachers began to initiate and coordinate their efforts as they gravitated toward a budding professional network in North Orange County.

An ILC leader recalled how the idea of doing joint workshops initially arose from a casual conversation at an early ILC conference:

I think it was the first year of [the] ILC. We were at a table—me, [an ILC teacher leader], and a couple other people—and I had said, "You know, why are we just thinking [about] training in our own district? I think we can think bigger than that, because let's look at who we have sitting at this table. We all have different expertise. We could find a site and do a bigger training."

## The “Teachers Teaching Teachers” events

This ambitious plan began to materialize when a particularly active and well-connected ILC leader reached out to a mathematics professor from the Orange County Mathematics Council, an organization dedicated to improving the teaching of mathematics. The professor advised him to reach out to CSU Fullerton and ask for permission to use campus facilities to host a professional learning conference for teachers. The request was granted. The teacher leader reached out to ILC colleagues in Orange County and they responded enthusiastically. At very short notice, the group organized what would become the inaugural TTT event.

The first TTT event was held on a Saturday morning in May 2015 and offered simultaneous workshops in two time slots. Sixteen presenters offered 11 workshops across the two sessions to around 100 attending teachers and university teacher candidates. Most presenters were from school districts in Orange County, with others from further afield, including Riverside and San Diego counties. Following the proclaimed mission of the ILC project, presenters aimed to offer participants practical and effective strategies for making the instructional shifts pertinent for the implementation of the CCSS and NGSS. Workshop topics included cognitively guided instruction (CGI) in mathematics, using textual evidence to support a claim, and strategies to engage struggling students. (See Appendix D.)

Holding the event at CSU Fullerton was seemingly fortuitous. It turned out to also be particularly consequential and beneficial for the North Orange County Network in several ways. First, through connections with the university’s College of Education, the organizers invited students to the event, thereby opening the door to future initiatives for professional learning across the teacher education continuum. Second, the event captured the attention of the education faculty at CSU Fullerton. In an opening address at the inaugural TTT event, the dean of the College of Education issued an invitation to the team to return to campus for future events. In September 2015, just 4 months later, the team organized the second TTT event on the college campus. Third, ILC project members and representatives of the College of Education established productive professional relationships that were to produce significant outcomes. For example, the dean of education advised the ILC teacher leader to connect the network with additional organizations and embed the TTT into the programming of those organizations.

After several follow-up conversations with the director of CSU Fullerton’s CCT, the ILC leaders extended an invitation to the conference to members of the Student CTA (SCTA), the campus-based union affiliate for teacher candidates. A significant professional resource and dedicated supporter, the director assumed a crucial role in organizing future TTT events.

Significantly larger than the first event, the second event included three concurrent sessions, making it a whole-day event. The number of members of the planning committee and presenters rose to 40. Attendance ranged from 15 to 30 participants in 21 sessions. Structured as workshops, sessions focused on CCSS- and NGSS-related topics such as the standards of mathematical practices, project-based learning, fostering academic conversations and increasing depth of rigor, assessment strategies such as performative tasks, and using assessment data to improve learning outcomes. Over subsequent conferences, sessions included a range of additional topics such as formative assessment and the new science standards, strategies for implementing education

technology in the classroom, and presentations about the National Board, urging participating teachers to find more information and inquire about how to apply for candidacy.

The conference strengthened the institutional connections between CSU Fullerton and the North Orange County Network. ILC leaders in the network, as well as the CCT director and her staff at the center, recognized the many benefits of the collaboration for the work they were to do. The network gained access to a permanent and quite prestigious conference site, the endorsement of the College of Education, and the active involvement of the director of the CCT.

For the CCT, the interactions among veteran teachers and students who considered joining the profession during the conferences and beyond were constructive and valuable. Veteran teachers were able to share their knowledge and experiences. Teacher candidates and other students learned about innovative teaching strategies and were able to recognize the value of teacher professional knowledge and the potential of a collaborative and connected teaching force. The director described the workshops as of great value to her students. Holding the event at the CSU Fullerton campus provided convenient access for the center's students. They felt comfortable attending and engaging in meaningful interactions with the presenters and the other participants.

The network held a total of six workshops between 2015 and 2017, and about 60 teacher leaders made presentations and conducted workshops. Members noted that as the TTT conferences grew in reputation, they attracted presenters and participants from across all of CTA's Region IV. Participants' feedback was positive. For example, in response to the statement "The workshop was valuable," on a scale of 1 (not at all true) to 5 (very true), the average of the responses was 4.39. Using a similar scale and in response to the statement "The workshop session gave me information and tools that I can use to support the implementation of the new California Standards/NGSS in California Public Schools," the average of the responses was 4.34.

### **Widening and diversifying the teacher pipeline**

The conferences served as the springboard for the teacher leaders to expand beyond their initial mandate. Seeking to use their collective capacity to address the key challenges facing the teaching profession in California, the team developed two new initiatives: a university mentorship program connecting teacher candidates with experienced teachers who serve as mentors, and a high school mentorship program designed to recruit and diversify the teacher pipeline. The North Orange County Network is pushing these initiatives further, developing a model that seeks to create a coherent educator career pathway from school to college, and from early educator to National Board Certification.

In preparation for the second TTT event, two ILC leaders had reached out to the university's Student CTA (SCTA) affiliate asking the staff to encourage its members to attend the event and connect with teachers willing to mentor students. The program connecting CSU Fullerton students with mentor teachers began in January 2016 with a first cohort of eight students, and participation increased steadily, with 16 students and 12 mentors participating in the second semester of 2017. Students sign a contract in which they agree to spend at least 20 hours conducting observations at schools and classrooms with the guidance of a mentor teacher. These 20 hours were close to half of the 45 observation hours required for entry to the teacher credential program.

In its first year, both students and mentors received a small incentive for participation. In 2017, an NEA grant provided some financial support for the project. Mostly, the program has been driven by students' desire to be in schools and classrooms and have fruitful interactions with teachers. An ILC leader, founder of the program, said:

At the end of the semester, we try to do an event to celebrate and have the mentors come back and have dinner, and we give [the students] a certificate.

The first year, we gave them a \$25 Amazon gift card. This year, we will offer scholarships, because of the grant, which is nice. But that's not going to last forever, either. But most of them, they just want the opportunity to be in a classroom and meet a teacher, and work with them.

According to a university administrator, the mentorship program provided valuable experiences for CSU Fullerton students. Shadowing a teacher for part of the day and attending events such as school board meetings and school science nights, the students were able to get a more profound and realistic view of life in schools than they would have otherwise.

The increase in the number of participants and the continuation of the mentorship program to date show that it is a valuable initiative. It supports the work of the CCT and increases the university offering at a time when enrollment in teacher education programs is decreasing nationwide. The program further strengthens the connection between the ILC's North Orange County Network, the university, and the SCTA. By the third TTT conference, these three organizations were listed on the TTT program as supporting institutions.

The mentorship program highlighted ways in which the network was able to contribute to the profession beyond the conferences. Prior to the SCTA mentoring program, the CCT had been participating with the American Association of Colleges of Teacher Education (AACTE) in an initiative designed to diversify the teaching workforce by connecting undergraduate students of color who are potentially interested in pursuing a career in teaching with alumni of CSU Fullerton's teacher credential program. The ILC leader and his colleagues recognized that they could use their resources and connections to contribute to this initiative. By establishing a mentorship program for high school students, they set out to recruit talented individuals, particularly students of color, to the profession. Establishing a professional pathway became the second major project of the ILC North Orange County Network.

The goal of the high school mentorship program is to strengthen and diversify the profession by attracting and recruiting high school students to teaching, targeting individuals who are underrepresented among the teaching workforce, particularly men of color. Students in the program participate in a series of education-themed workshops and tutor elementary school students under teacher supervision. Experiencing the joys (and tribulations) of teaching, the high school students might look forward to attending college and becoming teachers. At the same time, the elementary school students gain support and benefit from much-needed additional learning opportunities if they are at risk of falling behind in their studies.

## Impact on Teaching and Learning

At ILC workshops, participating teachers experienced instructional tools and strategies that further student engagement: brief presentations, guided inquiries, interactions in small groups, formative feedback, and video analysis among them. During our classroom visits, we observed how ILC teacher leaders incorporated and modeled some of these instructional moves. We also heard from the teachers themselves and school and district leaders about instructional shifts in participating teachers' classrooms.

### Instructional Shifts

In implementing the CCSS in California, educators were encouraged to develop practices that fostered key instructional shifts.<sup>44</sup> For example, the instructional shifts in mathematics seek to deepen student understanding by focusing on a smaller number of standards but going into greater depth on each. Teachers are also asked to think about how standards connect and build across grades, as well as focus on conceptual reasoning and problem-solving processes. The instructional shifts in English language arts and mathematics are shown in Figure 4.

**Figure 4**  
**Common Core Instructional Shifts in ELA and Mathematics**

ELA Shifts	Math Shifts
<b>1. Informational Text</b> Building knowledge through <b>content-rich non-fiction</b>	<b>1. Focus</b> <b>Narrow</b> the scope of content and <b>deepen</b> how time and energy is spent.
<b>2. Evidence From Text</b> Reading, writing, and speaking grounded in <b>evidence</b> from text, both literary and informational	<b>2. Coherence</b> <b>Integration</b> across grades and subject areas
<b>3. Text Complexity</b> Regular practice with <b>complex text</b> and its academic language	<b>3. Rigor</b> <b>Conceptual</b> understanding, <b>procedural</b> fluency, and <b>application</b> of skills in problem solving situations.

Source: Common Core State Standards Initiative, <http://www.corestandards.org>.

The ILC workshops provided teachers with pedagogical approaches that supported the instructional shifts and helped engage students toward deeper learning. Teachers valued and enjoyed learning from and with their colleagues. They considered the teacher-led workshops more effective and legitimate than those delivered by external consultants, mainly because their colleagues were knowledgeable about the shared context and the educational needs of their students and were able to demonstrate, not only describe, the instructional shifts. A 5th-grade teacher in Madera said:

[They] were much better in meeting my needs than, say, a PLC meeting or somewhere where we were just talking about things. It went a lot deeper than just a high-level overview, and that's what I really liked about it.

During professional development workshops in ESA, teachers experienced and had opportunities to practice instructional approaches that they subsequently could make part of their lessons. These included formative assessment strategies such as *exit tickets*, a quick end-of-lesson method by which teachers can both check for student understanding of a lesson goal and receive feedback on how they should adjust future lessons to support student learning. These could be one or two quick multiple-choice or short-answer questions to gauge overall student understanding but could also use a written prompt to which students must write a short response. Sample prompts include:

- What was the main goal of today's lesson?
- What are three things I remember from today's lesson?
- Write a quiz question that reflects today's lesson.
- What's a question you have about today's lesson?

Other strategies included *gallery walks*, in which students work in small groups on problems and display their solutions at standing whiteboards, on poster paper, or laid out on tables. The student groups then rotate around to each of the other displays, discussing solutions, giving feedback, and in the process seeing multiple ways to approach a problem. Another was a *fish bowl* routine, in which a pair of students engage in a structured discussion that offers room for multiple approaches and perspectives, and the remaining students are in a circle around them listening to the ideas presented. The teacher serves as facilitator for the paired conversation and for a subsequent debrief in which students reflect on and discuss the various perspectives heard. In each case, the instructional strategies are designed to give students greater opportunity for active engagement in the lesson and to hear and articulate multiple perspectives to deepen their understanding.

Teachers described how what they learned made a difference in their teaching. "I [had] learned how to do algorithms: get the solution, not think about it. Now it's about talking and explaining the process, utilizing the correct vocabulary," said a middle school teacher. Another teacher reported how, by using these strategies, he had adjusted the flow of his lessons, refraining from "front-loading" vocabulary words and instead introducing them as they arose in context. He noticed that his students were developing fluency by communicating and sharing their mathematical reasoning with their peers. ILC post-workshop surveys and feedback forms also included comments from teachers such as: "Analyzing student work and coming up with strategies was effective," "It's helpful for me to know where my students are and what standards to revisit," and "I learned new strategies to help target the needs for students who are far below [grade level]."

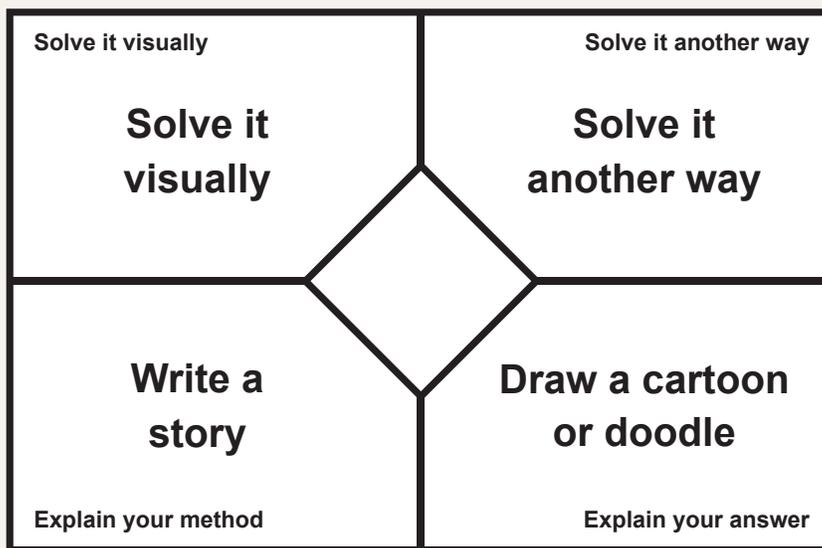
During our visit to one of these workshops (see "Moonlight University: Professional Learning in an East Side Alliance District"), we noted teachers' reports about how they incorporated some of these new practices in their classrooms.

## Moonlight University: Professional Learning in an East Side Alliance District

We observed one in a series of professional learning workshops known as “Moonlight University,” held after school in a middle school classroom in San Jose’s Mount Pleasant Elementary School District. Nine teachers were seated in two groups.

Beginning the session, participating teachers reflected on their experiences and own learning process as they implemented new instructional strategies since the previous workshop. One teacher described how he had used the paper diamond tool in his class and commented on the difference between the previously high-achieving students’ continued preference for algorithms and the lower achieving students’ openness to using visuals. Another said that the use of visuals helped to clarify her students’ understanding of different kinds of angles.

**Figure 5**  
**Template for Paper Diamond**



Source: From handouts at ILC East Side Alliance professional learning workshops.

The group then turned its attention to number talks, a strategy in which teachers encourage students to come up with multiple ways to solve a problem and then share these aloud with the class, a classroom routine designed to support students’ sense of numbers and operations as well as ways of communicating about mathematics in the classroom. In a number talk the teacher poses a math problem and asks the students to share how they would solve the problem mentally. Students then discuss the different ways their peers approached the problem.

The ILC teacher leader modeled a number talk during the session. After viewing a number talk video,<sup>45</sup> the teachers discussed their experiences to date implementing the technique. The teacher leader then introduced a hand-signal technique called fists of five to help teachers with number talk. Using  $15 \times 65$  as an example, she demonstrated how students holding a closed fist against their chest unfurl their fingers one by one as they think of five different ways to solve the problem.

Pairs of participating teachers then practiced number talks, taking turns alternately in the role of student and teacher.

During the second part of the session, the group focused on a stepping stone protocol that uses the following activities to prepare students for word problems on the state's CAASPP assessment: Review the problem, address any student questions, give students time alone with the problem, discuss as a class, and teach a mini lesson based on the problem. In a lively discussion, teachers commented on, practiced, and offered suggestions on how to use the protocol in their classrooms over the course of a week for the benefit of their students' learning. Next, the teacher leader demonstrated how to fold an exit ticket into the protocol, a formative assessment technique used to tap into student thinking and understanding. The last part of the session was dedicated to teacher collaboration and lesson planning.

During classroom observations, we saw teachers incorporating these new strategies and tools into their teaching practice. For example, in a 5th-grade class in Madera, we saw the teacher employ workshop tools such as sentence frame protocols to structure dialogue between students and model the use of academic language as a class tackled word problems in mathematics. In a 2nd-grade classroom in Conejo Valley, students were learning science by doing science as they explored why different birds might have different shaped beaks. They performed various experiments and collected and summarized data.

Teacher leaders and district administrators described noticing a change in teacher mindset resulting from the ILC workshops. In Madera, there was evidence that teachers felt freed both to deviate from pacing guides and to turn over more of the speaking time to their students. “[Teachers] are much more willing to try things that they were fearful of before,” one of them described. These comments were echoed by teachers in ESA. One teacher noted:

[My teaching] definitely has changed because of all the workshops. I am now a better math teacher. I was able to learn different strategies. It's just a great program to be a part of, and I'm so grateful because honestly, without everyone's help I'd still be stuck doing the same old things.”

Instructional changes were also noted by some district administrators. In East Side's Alum Rock, a district administrator noticed that teachers now tended to engage with the more challenging parts of the curriculum, something they had avoided in the past.

In our math curriculum, we have something called project-based interactive learning. It's this one little segment where you don't necessarily give the kids instruction on how to solve this. They get the manipulative, they get the problem, and then they have to think through with a partner how [they] might work through this problem. That's always hard for [them]. It's supposed to be like a productive struggle, coming up with different ways of solving a problem. Many teachers skip that part because it makes them uncomfortable.... That's been something we've noticed, with the ones that understand it, we'll see that more in their classrooms.

## Student Engagement and Learning

The positive outcomes most commonly identified by the teachers were increased levels of engagement and changes in students' approach to learning. Teachers attributed these changes to the emphasis on using multiple strategies to solving problems as laid out in the CCSS in mathematics, such as the aforementioned number talks.

A teacher from Alum Rock described how using number talks led to greater student engagement.

Basically, we just put a circle on the board and wrote a number in the middle, or a phrase related to math. They just had to silently think about it on their own, and then they were able to share out what they thought. We wrote it up on the board and we attached their name to it. They got really excited that their name got to be attached to their explanation.

She added that the flexibility of using different strategies gave students further opportunities to demonstrate what they understood and how. Where previously some may have struggled to find "the right way" to solve a math problem, fostering a multiple strategies approach with techniques such as number talks encouraged students to explore various points of entry to solving a problem when they got stuck.

Perseverance in tackling difficult problems is one of the goals of the new curriculum and the new standards. Increased student engagement seemed to translate to greater perseverance, as perceived by a teacher from Mount Pleasant.

Because we're preparing for the state test, we've done math all day. All day Friday, all day Monday, Tuesday, and even today. And on Tuesday, yesterday, the one student who [is] very negative about math, he's like "Mrs. [teacher's name], I really, I like this better than having all the other subjects. Because it's actually fun." And so for him to say that I was very surprised. They really did enjoy it. They had fun in doing it.

Teachers we interviewed attributed increased student engagement to changed patterns of interaction in the classroom. A Madera teacher reported that by giving students more class time to talk, they became more actively involved in the lessons: "I see changes in the students, and they seem a lot more engaged. And engagement is everything. If you don't have students who are engaged, it's hard for them to learn, because they're not with you."

A middle school teacher in East Side's Mount Pleasant district reported a shift in her students' disposition toward mathematics as she incorporated new teaching strategies, as even one of her toughest students found mathematics enjoyable despite 4 days of mathematics test preparation, noting:

My students are more engaged. They love the math block. They love collaborating more. They love basically the different strategies that I used from [the ILC workshops]. They are having more of a growth mindset when it comes to math. I know from previous years that they come into the classroom already saying, "I can't do math, it's not my thing." But once I've implemented so many different strategies and number talks and collaboration that we've learned, they become more receptive. My students help one another, they're collaborating, they're working as a group. Two years ago, none of that was really happening within the classroom.

Similarly, a 2nd-grade elementary teacher in Conejo Valley reported that her students felt empowered to do authentic science activities and appreciated the curriculum and new ways of learning:

They can tell the difference when I'm teaching from the book and when we're doing something that's much more integrated. They respond better.... We spent an hour and a half building elf traps ... and they spent the whole hour and a half designing, talking to each other, showing each other, coming up with different ideas. It was so much fun. And they learned a lot.

### **Vertical Collaboration in Action: Co-teaching in Conejo Valley**

We observed a combined 1st- and 2nd-grade classroom co-taught by an elementary teacher and the two ILC high school teacher leaders. The class focused on conducting an experiment and collecting authentic data. Underlying the design of the lesson were central NGSS crosscutting ideas such as structure and function as well as biodiversity and adaptation.

The elementary teacher began by reminding the students of previously encountered concepts: adaptation and biomimicry. Showing the students pictures of birds, she asked them to turn to a partner and talk about why different birds might have different kinds of beaks. As students proposed their explanations to the whole class, the teacher responded by deliberately using science discourse (e.g., “observe carefully,” “mimic,” “parameters,” and “survive in the environment”).

Next, students worked outside using the provided implements. In groups of four, they investigated why different birds might have differently shaped beaks. Their task had three parts:

1. Pick up “food,” i.e., sunflower seeds; cooked spaghetti; and a piece of soft, chewy candy in a shallow water container by using “beaks,” i.e., a spoon, a pair of tweezers, or chopsticks—all items on a tray.
2. Discuss which beak was most useful for picking up which kind of food while consulting pictures of different birds sporting different beaks.
3. After collecting their data, they were to post the result of their discussion in the appropriate box on a large 3' × 3' chart showing a matrix of the types of foods and the types of beaks by using a colorful sticky note. While there seemed to be general agreement among the groups' responses, there was also variability.

Moving among the student groups, the three teachers encouraged students to ask questions of each other, describe their observations, and give reasons for their conjectures. All three teachers engaged with the students working in their groups. They asked questions and urged students to share their thinking with one another.

As the students were manipulating the materials, they discussed why some beaks were more appropriate for certain foods than others. Some students were speculating how a spoon or a pair of tweezers was more or less like a bird's beak.

In a whole-group discussion back in the classroom, the elementary teacher asked a few students to justify their group's decision while refraining from agreeing or disagreeing with one response or another. The students were surprised that not all groups had similar experiences.

Next the class transitioned to a writing exercise. The students reflected on their activity, recording their thoughts in their notebooks. The elementary teacher encouraged them to use “thinking stems” posted on the wall to help kick-start their thinking and connect their thoughts to prior knowledge before formulating their answers. Examples of thinking stems included “That reminds me of ...” and “I’m remembering that...”

The bell rang, and the teacher promised the students that they would read their responses the next day.

The debrief meeting after the lesson ended was an important part of the professional interaction among the three teachers. The conversation began with a review of the NGSS standards addressed with the lesson, followed by discussion of the manipulatives and resources that were available in the science kits and other locations. They brainstormed ways the activity could be extended to include different environments for the “birds” to retrieve food; for example, a concrete surface or long grass.

The longest portion of the meeting was devoted to a discussion of the ways students worked together in the groups. One of the teachers noted that several students who were asked to represent the group by posting the sticky notes were hesitant and looked for confirmation from other members of the group, indicating that the decision might not have been reached by consensus. The teacher noted that although some group members were huddled around the same tray, they were not yet engaging in sustained discussions about what they were doing. She suggested working with her students on how to ask questions and help each other problem-solve during the experiments.

The meeting ended with the teachers searching their calendars for times available for the next meeting. They seemed eager for the next opportunity to co-plan and co-teach.

Beyond student engagement, teachers also observed specific skill acquisition among their students as a result of the workshop strategies. A 4th-grade Madera teacher described students’ ability to use the sentence frames frequently and with precision. Another noted how her students began to transfer their language skills:

Once they got used to using the sentence frames and completing them, they were able to answer and restate questions, for example, by putting the question inside the answer. Then, they would bring it over not only from reading and writing, but [also] into social studies, science, and math.

We saw how these skills were built by observing a 1st-grade class in Madera. The teacher explained that she worked with these younger students on skills such as sitting “knee to knee,” and turn-taking in dialogue. She used sentence frames such as “I like ..., because ...” to give students practice. The teacher modeled an exchange with a student and then asked them to “stand up and pair up” and, first, to share what they liked to do each day and, second, to incorporate content from the lesson’s “essential question” (why people trade goods and services with each other). During content development she returned to a similar structure, “I would rather ..., because ...,” and asked them to share their answer with the group. The teacher, an ILC member herself, demonstrated the explicit use of the sentence frames designed to link students’ opinions and reasoning, a structure similar to those shared with teachers in the ILC professional development workshops. She made connections to students’ everyday experiences. As students moved from one participant structure to another

(collaborative conversations in small groups; brief interactive whole-class presentations; fast-paced, short teacher-student exchanges), the teacher created a language-rich environment with multiple opportunities for the development of students' oral proficiency.

A district representative in Conejo Valley made a more general observation. She noticed that overall, with multiple acceptable outcomes, students in the district were more apt to take risks in their classroom work. Such a shift in students' dispositions toward science was particularly important for the community in which many parents worked in high-tech and biomedical research institutions. She attributed this outcome to the work of the ILC teams.

The district representative also noted positive shifts in the flow of the lessons and in the teachers' perceptions of their role. She described increased student engagement and the development of specific skills, such as using disciplinary discourse in context.

The changes that I've seen in the classroom have been that teachers now don't feel like they have to front-load science vocabulary and information—that it comes through naturally. I've also seen the integrations of sentence frames to support the students. I think that is really new. Then I think the new concept for many of the teachers, too, is the fact that you're a facilitator.... The kids are not distracted [and] off-task; they're engaged in their own learning process. I think that for some of our teachers, that's been a big shift. [Previously] they had to control everything to make sure that child is focused and behaved.

Based on their analyses of student work samples, teachers who participated in the workshops led by the ILC teams felt that the changes in their instructional practices positively influenced their students' learning. A middle school teacher described the shifts he saw in his students' approach to mathematics:

I've certainly seen more of a capability to really start using the vocabulary and language. I've seen them switching their own mindsets in regard to how they might have viewed math before, to seeing that there's a lot more to it than just getting the answer.

This was echoed by a district administrator and later ILC member in Madera, who described what convinced him to support expanding the reach of the ILC workshops to other schools in the district:

Here's the thing that was a real tipping point for me.... I was seeing the evidence, but what we heard from teachers was, and this gets me a little bit passionate, they heard kids say things like, "I felt smart today." That's a huge thing to hear a kid say. When a 7th grader who's not doing well in school tells you they felt smart today, it's because someone taught them how to feel smart today, right?

Teachers we interviewed suggested that students responded positively to teachers showing their own efforts in developing new skills and modeling engagement and perseverance. For example, a teacher from Alum Rock said:

I'm always having to learn something new, and I never use the same lesson plan, every year for 30 years.... It encourages me to try other things, and to do what I tell my kids: "Making mistakes is an effort. At least you're trying, and then learning from your mistakes."

Her colleague described it as follows:

I told them, “Just like you’re in school and you’re learning, I’m taking these classes after school to learn things, and now I have to try them with you.” So, I was very honest with them about what I was doing and how this is helping all of us in our learning. They were very willing to do all of this for me, and it was extra aside from our regular curriculum. They couldn’t wait for me to go back [to the PDWs], and then do something new and different with them. They just loved it.

The teachers and the students were clearly all in this together. The openness to learning and an exceptional level of trust seemed to create a mutually supportive and motivating environment for students and teachers.

## Changing Systems and Professional Relationships

From its inception, the ILC has taken a systemic approach to enhancing instructional capacity and to broadening and deepening instructional practices in response to the adoption of the new standards and assessments. ILC teachers and site leaders created opportunities for teacher learning by recognizing expertise, by installing organizational structures that support collegial collaboration and trusting relationships, and by establishing strong connections to organizations and institutions that support the ILC’s ambitious goals.

In this part of the report, we describe the development of leadership practices of ILC teacher leaders and the development of productive and trusting professional relationships among the educators. We show how structural arrangements within and beyond districts support the ILC’s ambitious goals.

### Professionalism and Teacher Leadership Development

In the current context of struggles facing the teaching profession, the reported development of leadership practices, increased sense of professionalism, and self-efficacy were significant and promising findings of our study.

Teacher leaders developed their leadership skills both through their participation and training at ILC conferences and through the experience of their work as part of the ILC. Teacher leaders identified a local need, developed the materials and resources for professional learning, and gained valuable experience through leading professional learning workshops. They were proactive in developing the professional relationships necessary to make the workshops a reality and to extend their impact.

From its inception, ILC has taken a systemic approach to enhancing instructional capacity and to broadening and deepening instructional practices in response to the adoption of the new standards and assessments.

Some teacher leaders described how leading professional learning for colleagues had helped develop their own skills both as teachers and as presenters and opened opportunities for them to present at county events, statewide conferences, or CTA-supported events. An ILC member from North Orange County was recognized for his leadership work nationally. A teacher leader in Madera said the ILC helped her realize that professional learning was not solely the domain of university scholars: “It wasn’t magic sauce owned by people who get paid a lot more money than I do. The ILC was instrumental in [giving me] that kind of confidence.”

Her colleague explained that involvement with the program did more than allow ILC members to provide support for other teachers’ individual practice; it also helped teachers understand how they could work together as a professional community to move student learning forward:

[When] you’re in isolation and you’re just doing stuff in your classroom, you don’t know if it’s good. You don’t know if you’re actually having an impact. But when you can actually share it out with other teachers and get their ideas, it becomes not *my* idea but *our* idea. And if I’m struggling I have someone who can support me on it.

Trusting relationships developed among colleagues who worked together for a common goal. A teacher noted:

Creating the professional development with my team has pushed me to want to become better, and [helped me] notice the need. Professional development is never-ending. There’s always the need to develop as a professional.

ILC members developed their leadership skills by actively building relationships with colleagues, with district and county administrators, and with those in external organizations with whom they could progress the work for mutual benefit. For example, teacher leaders in Madera participated in school board meetings to explain their work and how it could align with district initiatives to support teaching quality. One teacher leader described:

We also went to our school board two different times and spoke in the public comment section, and thanked them for supporting our connection with the Instructional Leadership Corps. [We] talked about what we were doing, trying to present this teacher-driven change as a positive rather than a scary [thing]. So, we need to try to build those alliances and talk about how we could help district initiatives move forward.

Teacher leaders in Conejo Valley coordinated with administrators from the county office and visited the district superintendent’s office to present initial versions of their plan. They took on board feedback from each to help strengthen their plans and align these with parallel initiatives in each. They kept the district closely informed of their work, increasing district administrators’ confidence and contributing to the development of a mutually trusting relationship. As one of them said:

I think our district knows all three members of our team: They know who we are, they know the work that we do, they know what we’re trying to do, and we’ve met with them every time we’ve come up with a plan. We always tell them what our ideas are and where we want to help, so I think we’ve been very open in that.

In North Orange County, ILC team members developed their leadership skills by building relationships among each other and colleagues to create a professional network. Members realized they could draw upon their considerable collective experience to serve as resources for each other, elevating the teaching profession in the process.

This sentiment was echoed by teacher leaders in Conejo Valley who felt that in developing their own teacher leadership skills through the ILC, they were participating in a teacher-led movement to raise the quality of teaching and boost the profession. One noted:

It gave me a power. It gave me power to say, “I think this needs to happen,” and it gave me the support to make it happen.

Sustainability of the ILC was an important realization: “The biggest thing that I’ve learned was how you can perpetuate [change] ... how we can just help other teachers to learn, and how those teachers can take it and help other teachers to learn about things that we are teaching.” The sense of responsibility for continued quality work within the community is a mark of leadership that extends beyond the here and now.

ILC participation encouraged the teacher leaders to expand their network of support to other organizations and individuals involved in similar efforts. As one of them said:

So, I can call the head of the California Science Project and talk to her about science projects and what can we bring to Madera, and I’m confident and comfortable doing that. I don’t know if I would have been comfortable talking to the leaders of these organizations in that way if I hadn’t done ILC work.

Establishing professional networks was an effective strategy in North Orange County, where the ILC team partnered with CSU Fullerton to organize biannual professional learning conferences. The director of the university’s CCT explained how establishing such networks was key to supporting student teachers:

The better their relationships are with current teachers, the easier it is for them once they become a teacher and have their own classrooms. They are probably more likely to stay in the profession if they have a network of folks who support them, even before they start the credential program.

The professional network gave the teachers a renewed sense of collegiality, purpose, and common mission that reaffirmed their professional identity and kept them engaged:

We’re very diverse people. But we like each other, and we have a love for this work. And if we just stayed in our little compartments and talked, I don’t think any of us would be happy. I would probably be retired.

## Supporting Quality Beyond the Single Classroom: A Community of Professionals

Helping teachers gain confidence and see the potential in all their students reinstalled a sense of professional responsibility for student learning and well-being that extended beyond a teacher's individual classroom. As one teacher leader noted:

The ILC, for me, has been [about] how we can carry not the same exact ideas, but that same passion and belief that we can do better. When you get caught up in how my school is doing or how my district is doing, we forget that it's a larger stage. That we're not just here for this small group; we have to impact as many as possible if we're true educators.

Teacher leaders at all four sites sought to extend their efforts to reach more teachers as well as to bring about systemic changes. Changes in professional relationships were a key outcome of the work of ILC teacher leaders in the four case study sites. Teams variously formed partnerships among schools in their own districts, and among districts, county offices, universities, and funding organizations. These partnerships not only gave them access to intellectual and financial resources, but also allowed them to deliver consistent messages and expectations about standards-based pedagogy as they reached a broader teacher audience.

At times, the work of ILC teacher leaders contributed to improved relationships between the union and district administration. In Madera Unified, for example, there had been significant labor tensions in 2012–13 around contract renegotiations. Yet, in June 2016, two ILC educators—one the local union vice president and the other a high-level district administrator—delivered a joint presentation at the ILC San Jose regional conference. Their presentation focused on leadership in Madera and noted that collaborative union-district efforts with the Common Core Steering Committee and district academic initiatives had been shaped by the work of the ILC.

The development of mutual trust between district administrators and teachers, due in part to the work of ILC teacher leaders, supported changes in the classroom. In the past, many Madera USD teachers felt that Teachers on Special Assignment (ToSAs) had primarily focused on monitoring fidelity to the district's model of Explicit Direct Instruction and movement through the curriculum in step with pacing guides. Currently, district-appointed ToSAs play a key role in instructional coaching.

In Alum Rock, ILC teacher leaders were also able to navigate difficult terrain. When negotiations between the district and the Alum Rock Educators Association stalled in 2016, two ILC teacher leaders, also members of their union's executive board, were able to maintain dialogue with district representatives about the ILC's work, ultimately emerging from this period as productive partners in offering professional learning. Their activities increased the district administrators' confidence in the work of the team and contributed to the development of mutual trust.

The development of mutual trust between district administrators and teachers, due in part to the work of ILC teacher leaders, supported changes in the classroom.

The ILC workshops became an integral part of the professional development offerings in Alum Rock. “It’s one of our main PDs,” said a district administrator. As such, the workshops were included in the professional learning calendar, and emails, flyers, and reminders were sent out to the teachers. The district paid extended duty to teacher leaders for planning and leading the workshops and to participating teachers, purchased necessary textbooks, and provided substitute teachers for teacher leaders to attend ILC conferences. Following positive feedback from the series of workshops, the team was asked to develop a formative assessment workshop series, to lead sessions as part of the district’s PD days, and to develop a program of lesson study PDWs in 2017–18.

To assist the team in planning and facilitating the workshops, the district appointed an instructional coach, whose responsibilities included supporting fellow coaches and participating in a district-led Instructional Leadership PLC. A committee of school principals and site-based instructional coaches was created to support the development of school-level theories of action for improvement. Institutional arrangements provided a mechanism by which the work of the ILC could be leveraged to contribute to changes in instructional practice in the district.

In Conejo Valley Unified School District, the agreement between the Unified Association of Conejo Teachers and the district regarding required professional development hours allowed for 6 of the 12 hours required annually to be teacher-directed and dedicated to teacher collaboration. These 6 hours could be used for professional learning at their school site or, with authorization from the principal, they could be used to attend professional learning opportunities at alternative sites. The cooperation between the district administration and the teachers association provided flexibility to ILC members to offer workshops, and to the teachers, incentives to attend those workshops.

The association also directly supported the ILC teams in getting the workshops off the ground. ILC teacher leaders reported that the representatives of the regional association provided encouragement and feedback on the work of its members and provided refreshments during the workshops. A union representative at the district said:

I think the CTA is putting their money where their mouth is, and you know, they have said for years, [they] believe strongly in making the teaching profession better. I think for [the CTA] to remain relevant as an association, we need to keep focusing on things like the ILC, and that’s why I believe so strongly in it. I love that they’re actually trying to do this.

ILC workshops were included in the district’s professional development offerings and calendar. District officials showed their appreciation by considering participation in ILC-led workshops as partial fulfillment of the number of professional development days or hours required annually, and teachers received their full salary. The district often paid for snacks for workshop participants and provided stipends for the presenters.

Outside their home districts, ILC teacher leaders connected with organizations and institutions that supported and promoted their work. Conejo Valley teacher leaders were connected with the Ventura County Office of Education, which hosted numerous events for teacher leaders and administrators

from different districts and played an important role during the statewide rollout of the CCSS and the NGSS. These events were designed to spread the information among the teaching staff and the administrators in the home districts. The county office was also instrumental in connecting the ILC leadership team to other educational organizations, such as the K-12 Teachers Alliance, Bay Science, and science educators at Stanford University. In reference to a set of learning events offered by this network, a district representative explained:

I have a group of teachers that go to that. Then there's the offering [the county] had yesterday regarding assessment. I had many members of my team and then some extra teachers as well that wanted to go. We sent people to that. I think that really, we work hand in hand to make sure that we're up on the newest information coming out, or we also use our county [representative] who has come and presented and completed PDs in our district as well. It's like a web. It's just everybody working together to support teachers in learning and to support quality instruction and, ultimately, student achievement.

Developing and fostering relationships with organizations and institutions as well as administrative and financial support from district offices are vital for sustained activities of ILC teams. The East Side Alliance ILC teams were able to secure and benefit from resources gained through productive relationships within the Alliance, the Santa Clara County Office of Education, and the respective home districts of the ILC team members.

The opportunities for professional learning offered through the ESA with the support of the Silicon Valley Education Foundation were substantial and impactful. Teachers who were able to attend the symposia heard about up-to-date research and innovative instructional practices in mathematics education. Teachers who participated in the mathematics PLCs focused their efforts on implementing the instructional practices and analyzing and reflecting on their work in the company of their colleagues. Participation in the ESA expanded the ILC teams' professional ties and opportunities. Organizational structures such as the district-sponsored Moonlight University, and institutional resources such as an ILC teacher leader moving into a half-time position as an instructional coach, facilitated their work and supported their successes. This was noticed by teachers, who felt supported by the district. As one of them observed:

Our district superintendent is very passionate about the math program.... You know, just about education in general, and [she] really wants to promote teachers learning more and implementing more strategies and getting more practice. She believes in that, and so I feel like in a way she fights for us to get what we need and so just to motivate us. They'll bring us snacks, they'll bring us some kind of dinner, they'll give us our hourly pay and everything, just as a thank you and to motivate us as well.

In bringing together teacher leaders, the ILC formed linkages that allowed teachers to capitalize on their collective capacities and strengths. Teachers feel empowered to look to each other as resources, as a teacher leader from Madera commented: "Having that network where maybe something isn't going well for someone [reminds] you that we're going in the right direction. And if we're not, how do we shift that? How do we become stronger together?"

## Lessons Learned

Making a transition to the CCSS is a lengthy and challenging process. These standards' emphasis on conceptual understanding and problem solving requires significant changes in classroom instruction. Teachers realize that classrooms that include students with a wide range of previous academic achievement, varying levels of English proficiency, and different interests and learning needs pose complicated pedagogical challenges. Teachers recognize the importance of well-grounded strategies and complex approaches to address all students' learning needs in such classrooms.

In this report, we described how ILC leaders bring about some of these changes for the benefit of the students—more and deeper interactions, increased oral and written proficiency in the language of instruction, use of multiple strategies for mathematics problem solving, and engagement in science and engineering practices at all school levels. The lessons learned will help inform and shape similar efforts going forward.

Our study of the four sites illustrates how the ILC sparked a successful and systemic course of action for providing professional learning opportunities for teachers. Teachers and site leaders, members of the ILC project, recognized the value, support, and intellectual leadership of the ILC project leadership and the three partner organizations constituting the project.

The ILC project provides a necessary infrastructure as well as conceptual coherence to the extended and widespread network. It can instigate opportunities for professional development of new teacher leaders, thereby further increasing implementation capacity. Continued development of the project can build on the solid base created to date. The ILC can inform efforts to build professional capacity for the implementation of the CCSS and the NGSS not only in California, but in other states as well.

Below are five central lessons that emerged from the findings of this research.

### **1. Teachers value professional learning led by their colleagues.**

Contrasting ILC workshops with traditional professional development offered by outside consultants, teachers with whom we spoke expressed their unconditional preference for learning from and with their colleagues whose knowledge and experience they recognized and trusted. Teacher leaders developed professional learning that was attentive to local needs, and they were able to provide professional learning that was attuned to the specific implementation challenges facing teachers in their districts. ILC teacher leaders who worked in the same district were also more accessible for follow-up questions, advice, and support.

Teachers who participated in teacher-led workshops valued these experiences. They recognized that their colleagues were responsive to and knowledgeable about the shared context and the educational needs of their students and were able to demonstrate, not only describe, some of the recommended instructional shifts.

The ILC teacher leaders shared with us their excitement and commitment to the work. They also expressed their desire to expand the work, reach more teachers, and provide more extensive support to their colleagues.

We found that the ILC demonstrated success in elevating teachers' understanding of the new standards and assessments, in presenting instructional strategies that support students' learning, and in developing teacher leadership. ILC teacher leaders and their colleagues, as well as site administrators, described increased student engagement as a main effect of the CCSS- and NGSS-aligned curricula and the changing patterns of interactions in the classroom.

## **2. ILC membership enhances teacher leaders' professionalism and sense of efficacy.**

Beyond the impact on teachers' work in their home districts, creating and leading professional learning for colleagues was highly beneficial for the ILC teacher leaders. Realizing that they were having an impact on shaping other teachers' practice increased their sense of professional efficacy. Broadening their professional reach beyond their classrooms, they amplified their leadership skills as they initiated innovative activities and solidified professional relationships.

ILC members were proud of their work and accomplishments. One of them said in her interview: "I think we all feel really good about the work we're doing, and here's the thing. If it weren't for us, I don't think this work would be getting done." She regarded them as being engaged in a grassroots teacher movement:

Think about it this way. [Some] districts have a vision that they need to be doing [professional development]. Their idea is to bring people in from the outside. When ILC first started, that's what I saw. And the ILC were saying "Wait a minute, you've got people right here. You've got resources right here."... We happen to have some very talented science educators who do work for the county and do other kinds of work, who are really aware of it and are really passionate about it, so it was definitely a grassroots, teacher-up [approach].

Empowering the profession was a frequent theme in the teacher interviews. An ILC teacher leader said it best:

In the end, that's one of the main reasons why the ILC really attracted me ... the idea of empowering teachers to do something to improve their own professional practice and to be part of changing culture to a level where change is the norm, and change internally is the norm.

## **3. Supportive structural arrangements foster instructional change.**

The curricular and pedagogical shifts in the ways students learn and teachers teach that were needed in response to the adoption of the CCSS and the NGSS were ambitious, profound, and demanding. Moving from scripted curriculum and pacing guides to planning lessons with engaging learning activities could not happen quickly or effortlessly.

Several teacher leaders noted that awareness and involvement from school and district administrators were necessary if changes in instructional practice were to be sustained, because of their role in allocating resources and acting as instructional leaders. Said one teacher leader, quoting her colleague:

Please, have the principals make this the priority, because if it isn't a priority for principals, it won't happen. What doesn't get monitored, doesn't get paid attention to.

A teacher in Madera shared with us that many principals and Teachers on Special Assignment had become accustomed to using classroom walk-throughs to assess fidelity to the Explicit Direct Instruction approach adopted by the district and implemented in the past. She and her colleagues had felt compelled to follow the scripts and adhere to pacing guides. This practice ran counter to the pedagogical approach promoted by the CCSS. The shift in how to conduct classroom observations and provide feedback and support to the teachers had to be profound. Under this new paradigm, site-level administrators needed to play a very different role. A teacher leader, now vice principal, described how this was changing:

Recent evaluation criteria are so different for the walk-throughs because we want to slow down, we want to know what kids actually know, not move on. [Teachers] turn in pacing guides to me and I never look at them. I don't care. I want to know what the kids are learning. I say, "Here is your target. You are the professional. Figure out how to get there."

Broadening the work to include greater administrator involvement is an aim of the ILC going forward. The ILC increased the number of administrators among its members in its third year as well as in the beginning of the second 3-year phase. This has been further aided by many ILC teacher leaders moving into roles with the district, in part due to the success they have achieved with the ILC.

Finally, time is one of the most critical resources to shaping teaching practice. We found that in order to support the teachers in implementing the classroom practices necessary for student learning aligned with the new standards and assessments, the ILC teachers and their colleagues needed time and material resources for sustained collaboration. Together they needed to plan lessons, observe each other's classrooms, analyze the work of their students, and discuss and reflect together on their experiences. Teachers had more opportunities to do so when administrators at the school and district level provided resources and built structures that allowed and supported collegial collaboration. When ILC teams were able to initiate systemwide structural changes, they were able to create conditions for the project to take root in their locale.

#### **4. Systematic follow-up contributes to implementation of instructional shifts.**

Achieving depth versus reach is a perennial dilemma in teacher professional learning initiatives. We observed that lasting changes in pedagogy were more likely to occur when teachers had the opportunity to try out new strategies, receive feedback, address challenges in implementation, and iteratively improve over the course of multiple workshops, with advisors and coaches at hand. We observed teams grappling with the question of how to reach a large enough number of teachers to adapt content to the new standards while still providing the kind of close support associated with meaningful changes in pedagogy.

Frequency and quality of the follow-up opportunities are variable yet indispensable. Follow-up usually consisted of teacher self-reports; verbal or written reflections with colleagues; and, sometimes, samples of student work. Follow-up that involved either the modeling of teaching practices in the classroom by ILC teacher leaders or observation and feedback of participant teachers trying out the instructional strategies was rare but important. Designing for long-range engagement and follow-up is a key element of lasting change and should be part of initial plans, so that the many benefits of teacher-led professional development can be secured.

## 5. Strategic relationships support deeper, more widespread professional learning.

ILC teacher leaders were able to get the greatest traction when they were able to build relationships with district administrators, teachers associations, county offices of education, universities, and philanthropic organizations. Partnerships with county and district offices, universities, and funding sources supported content alignment and leveraged financial and logistical resources at the local level.

As mutually trusting relationships developed, districts and teachers associations were increasingly willing to contribute resources. Direct financial resources such as stipends for presenters and participants, meals for participants (valuable for after-school workshops), and release time for ILC leaders were welcome. Collaboration with colleagues and site administrators brought substantive support as well as logistical assistance.

The significant investment of financial resources, effort, and time produced professional and personal rewards for the ILC teacher leaders and the teachers who participated in the larger and smaller scale activities. These trusting professional relationships were able to develop despite at times contentious debates in other arenas.

ILC teams were more successful when teacher leaders were able to connect to organizations and institutions that recognized the inherent value of their work and were willing and able to provide support and resources. Maintaining these connections and establishing productive relationships are necessary for project continuation and institutionalization.

Teacher leaders selected for the project brought with them extensive experience in classrooms, commitment to improve students' learning, and dedication to and a desire to strengthen the profession. Their professional expertise, their credibility, and their perceived legitimacy to offer high-quality professional learning were central to the successful outcomes of their activities. This was particularly important in the early phases of the project, as teacher leaders approached districts and other partners to offer themselves as providers of professional learning, something previously uncommon in many districts.

In addition, the ongoing guidance and support; the access to intellectual and academic resources; the sustained professional interactions; the upkeep of the professional network; and the personal recognition provided by the ILC partnership of SCOPE, NBRC, and the CTA were and continue to be indispensable. Here is an example:

It's a unique project. It's really exciting to think the power of an idea could make that big a difference. I hate to say it, [but] as a classroom teacher, you're not used to being able to have that kind of exponential influence. But that's what CTA and Stanford [SCOPE] and National Boards [NBRC] are doing with this project. [It] is giving teachers that ability to identify a need, go and fill it, and then be able to provide that lesson or skill set to others. That's pretty exciting.

The current and future teacher leaders need to continue to learn as they teach their colleagues. They need to continue to develop and refine their knowledge in additional domains and aspects of teaching as new issues surface. Providing learning opportunities and organizing structured professional encounters among them and for them are essential for the growth and the strength of the network. The existence of a solid organization that continues to guide and support, document and assess its outcomes is vital for the continued success of the ILC project.

## Conclusion

Our study of the four sites demonstrated the ILC's success in elevating teachers' understanding of the new standards and assessments, presenting instructional strategies to support students' learning, and developing teacher leadership. When teachers used more active strategies, students were more engaged and approached learning with excitement. Teachers with whom we spoke recognized the value of the productive collaboration among the three organizations that introduced and supported the ILC and provided the framework, resources, and scholarly expertise. At the local level, partnerships with county and district offices, universities, and funding sources can align content and leverage financial and logistical resources.

To transform classroom practice, it is imperative to effect change in the local systems. The significant investment of financial resources, effort, and time produced professional and personal rewards for the ILC teacher leaders and the teachers who participated in the larger and smaller scale activities. Importantly, the many teachers reached by the project reaffirmed and recommitted to their chosen profession.

The ILC is a pathbreaking effort and a solid template for offering professional learning opportunities for teachers and other educators. With continued support, it will continue to succeed in deepening teachers' knowledge of the new standards and assessments, as well as the instructional capacity needed to support students in meeting the standards.

## Appendix A: Instructional Leadership Corps Study Methodology

This study of the Instructional Leadership Corps (ILC) used a case study methodology. Site selection began with discussions with members from two of the three organizing institutes—the Stanford Center for Opportunity Policy in Education (SCOPE) and the California Teachers Association (CTA)—who provided an initial list of 24 ILC teams or projects that had reported success in having the project take root in their district. The Learning Policy Institute (LPI) team selected four case study sites based on additional quantitative data of teachers reached and feedback from participating teachers. Preliminary phone calls with ILC leaders were used to gain further background information. Final site selection balanced geographic distribution, professional development workshop content, and engagement with local organizations.

The LPI team conducted site visits in 2017 for each of the four cases studies. We interviewed a total of 40 participants in person (including 28 teachers and 12 school or district administrators), with additional follow-up interviews conducted by phone as necessary. We conducted two observations of ILC regional conferences, seven observations of ILC professional development workshops, and four observations of classroom teaching. Interview analysis was conducted using Dedoose qualitative software using a combination of inductive and deductive coding.

Interview and observational data were supplemented by survey data collected by SCOPE. The LPI team also had access to a range of additional artifacts, including ILC videos and video transcripts, ILC professional development presentation materials, planning documents, and project reports.

## Appendix B: Model for Professional Development Sequence

### For Teachers: Essential PD Workshop Components

Each PDW for teachers should model an instructional shift within a subject area. You may want to use the Planning Your Professional Development Workshop Session I document to assist with the planning of Session I.

Session I should have the following 8 components woven into its design:

1. Choose the instructional shift you will demonstrate in Session I.
2. Use the Planning Your Professional Development Workshop Session I document as a set of planning principles for designing an experience of the instructional shift (e.g., participate in a Number Talk, practice providing “stronger and clearer” responses, or engage in a scientific argument) that you will model for participating teachers.
3. Lead participating teachers through an experience of this instructional shift.
4. Give participating teachers a concrete example of what occurs when students learn content with this instructional approach (e.g., watch a video of students participating in a Number Talk; examine samples of student work associated with this instruction).
5. Using the Instructional Thinking: Considering the Four Domains document, facilitate a conversation about how well the lesson that participating teachers just experienced attended to these 4 domains. Discuss what else would need to occur to enact this instructional shift in their individual classrooms.
6. Ask participating teachers to consider their own teaching context. Where do their students particularly struggle? How well does this particular instructional shift address what their students are struggling to do? If not very well, what instructional shift/move would better meet their students’ needs?
7. Ask participating teachers to select an instructional shift to try out in their own classrooms. Have attending teachers use the Selecting and Using an Instructional Shift in My Classroom document to plan to teach the selected instructional shift in their classroom.
8. Facilitate a conversation among attending teachers about what artifacts of student learning they can bring back to Session II to see what happened as a result of trying out this particular instructional shift in the classroom.

Between sessions, consider how you will have attending teachers examine and discuss the artifacts of student learning that they bring back to Session II. What do you want teachers to learn from this experience? How will you support teachers to design their next instructional move as a result of looking at the resulting student work? The Session II workshop should focus on sharing of artifacts and choosing another instructional shift to try. Refer to page 2 of the ILC Project Description for additional guidance regarding the purpose of and activities for Session II.

## For Site-Based Leaders: Essential PD Workshop Components

If you are designing a PDW for principals or other site leaders about how to grow school conditions to support teachers' learning and cultivate teacher leadership in the design and implementation of effective CCSS/NGSS instruction, your Session I should have the following components:

1. An experience with a Smarter Balanced Assessment task item and/or an instructional shift and the student work that results. Make sense of the experience through a discussion:
  - a. What do the CCSS/NGSS require students to know and be able to do?
  - b. What do the CCSS/NGSS necessarily require teachers to know and be able to do?
  - c. What site conditions are needed to support teachers to enact instruction that will support students in achieving the CCSS and NGSS? (Consider using the Instructional Thinking: Considering the Four Domains document to aid this conversation.)
2. Provide a concrete example of what occurs when teachers are supported to try out new instructional approaches, such as by reading *Instructional Capacity: How to Build it Right*.
  - a. In conversation, generate a list of leadership moves (and shifts in leaders' thinking) that will be needed to create these conditions in our schools;
  - b. Consider how these leadership moves will grow the site conditions needed for continuous instructional improvement.
3. Ask site-based leaders to identify a leadership move to try out at their workplace (e.g., the weekly staff meeting or a grade-level team meeting). Consider:
  - a. What are teachers in the workplace struggling to do?
  - b. How will this particular leadership move support teachers' learning and cultivate teacher leadership?
4. Have site-based leaders consider what artifacts from this experience (e.g., samples of teacher work) they could bring back to Session II.

For Session II, consider:

- How will site-based leaders collaboratively examine their artifacts?
- If site-based leaders bring a teacher who experienced their leadership move to Session II, how can you help the group learn from these teachers?
- Did the leadership move(s) support developing instructional practice and/or teacher leadership? What do you see that makes you think so? If not, why not?
- How will you support site-based leaders to design their next leadership move in order to continue to develop site conditions conducive to learning?

---

Source: Reproduced from ILC materials provided by the Stanford Center for Opportunity Policy in Education.



## DOK Question Stems

<p><b>DOK 1</b></p> <ul style="list-style-type: none"> <li>• Can you recall ____?</li> <li>• When did ____ happen?</li> <li>• Who was ____?</li> <li>• How can you recognize ____?</li> <li>• What is ____?</li> <li>• How can you find the meaning of ____?</li> <li>• Can you recall ____?</li> <li>• Can you select ____?</li> <li>• How would you write ____?</li> <li>• What might you include on a list about ____?</li> <li>• Who discovered ____?</li> <li>• What is the formula for ____?</li> <li>• Can you identify ____?</li> <li>• How would you describe ____?</li> </ul>	<p><b>DOK 2</b></p> <ul style="list-style-type: none"> <li>• Can you explain how ____ affected ____?</li> <li>• How would you apply what you learned to develop ____?</li> <li>• How would you compare ____?</li> <li>• Contrast ____?</li> <li>• How would you classify ____?</li> <li>• How are ____ alike? Different?</li> <li>• How would you classify the type of ____?</li> <li>• What can you say about ____?</li> <li>• How would you summarize ____?</li> <li>• How would you summarize ____?</li> <li>• What steps are needed to edit ____?</li> <li>• When would you use an outline to ____?</li> <li>• How would you estimate ____?</li> <li>• How could you organize ____?</li> <li>• What would you use to classify ____?</li> <li>• What do you notice about ____?</li> </ul>
<p><b>DOK 3</b></p> <ul style="list-style-type: none"> <li>• How is ____ related to ____?</li> <li>• What conclusions can you draw ____?</li> <li>• How would you adapt ____ to create a different ____?</li> <li>• How would you test ____?</li> <li>• Can you predict the outcome if ____?</li> <li>• What is the best answer? Why?</li> <li>• What conclusion can be drawn from these three texts?</li> <li>• What is your interpretation of this text? Support your rationale.</li> <li>• How would you describe the sequence of ____?</li> <li>• What facts would you select to support ____?</li> <li>• Can you elaborate on the reason ____?</li> <li>• What would happen if ____?</li> <li>• Can you formulate a theory for ____?</li> <li>• How would you test ____?</li> <li>• Can you elaborate on the reason ____?</li> </ul>	<p><b>DOK 4</b></p> <ul style="list-style-type: none"> <li>• Write a thesis, drawing conclusions from multiple sources.</li> <li>• Design and conduct an experiment. Gather information to develop alternative explanations for the results of an experiment.</li> <li>• Write a research paper on a topic.</li> <li>• Apply information from one text to another text to develop a persuasive argument.</li> <li>• What information can you gather to support your idea about ____?</li> <li>• DOK 4 would most likely be the writing of a research paper or applying information from one text to another text to develop a persuasive argument.</li> <li>• DOK 4 requires time for extended thinking.</li> </ul>

From Depth of Knowledge – Descriptors, Examples and Question Stems for Increasing Depth of Knowledge in the Classroom Developed by Dr. Norman Webb and Flip Chart developed by Myra Collins

Source: Handout created by Dr. Norman Webb and Myra Collins, University of Wisconsin-Madison, and used by teacher leaders from Madera ILC during professional development workshops 2017-18.

## Language Strategies for Active Classroom Participation

### Expressing an Opinion

I think/believe that . . .

In my opinion . . .

Based on my experience, I think . . . I hypothesize that . . .

### Asking for Clarification

What do you mean?

Will you explain that again?

I have a question about that.

### Soliciting a Response

What do you think?

We haven't heard from you yet.

Do you agree?

What answer did you get?

### Reporting a Partner's Idea

\_\_\_\_\_ indicated that . . .

\_\_\_\_\_ pointed out to me that . . .

\_\_\_\_\_ emphasized that . . .

\_\_\_\_\_ concluded that . . .

### Disagreeing

I don't agree with you because . . .

I got a different answer than you.

I see it another way.

### Affirming

That's an interesting idea.

I hadn't thought of that.

I see what you mean.

### Predicting

I predict/imagine that . . .

Based on . . ., I infer that . . .

I hypothesize that . . .

### Paraphrasing

So you are saying that . . .

In other words, you think . . .

What I hear you saying is . . .

### Acknowledging Ideas

My idea is similar to/related to \_\_\_\_\_'s idea.

I agree with (a person) that . . .

My idea builds upon \_\_\_\_\_'s idea.

### Reporting a Group's Idea

We decided/agreed that . . .

We concluded that . . .

Our group sees it differently.

We had a different approach.

### Offering a Suggestion

Maybe we could . . .

What if we . . .

Here's something we might try.

### Holding the Floor

As I was saying . . .

If I could finish my thought . . .

What I was trying to say was . . .

(Kate Kinsella, San Francisco State University, 6/07)

Source: Handout created by Dr. Kate Kinsella, San Francisco State University, and used by teacher leaders from Madera ILC during professional development workshops 2017-18.

## Appendix D: Inaugural “Teachers Teaching Teachers” Conference Sessions

### **BREAKOUT 1**

#### **Session Descriptions**

Session Title: How to Align/Revise Old Science Curriculum Lessons to Next Generation Science Standards (NGSS) using Inquiry-Based Curriculum Lessons

Presenters: Pia VanMeter - Martin Luther King HS, Riverside Unified School District

Ashley Bettas-Alcala - Riley Elementary School, San Bernardino Unified School District

Session Description: Introduction of the NGSS focusing on the shifts needed to increase engagement in science and engineering practices including meeting and presenting the performance expectations. The session will include hands-on manipulation of old science curriculum in physical and biological science to an inquiry-based lessons and alignment of the lessons to the NGSS.

Target Grade Level: TK-6

---

Session Title: Unlocking Text Complexity Using Socratic Seminars and Critical Thinking

Presenters: Summer Peterson - Diego Valley Charter School, Julian School District

Paula Lempert - SIATech Charter High School, Vista Unified School District

Session Description: Learn how to facilitate Socratic Seminars in a way that puts the onus of learning and thinking on the students. Additionally, learn how to guide students in critical thinking during these discussions. You will get a chance to try the activities and will be given materials that you can use to implement these activities in your own classes.

Target Grade Level: K-12

---

Session Title: Technology In The Math Classroom

Presenters: Jason Chong - Parks Junior High School, Fullerton School District

Session Description: Technology tools that are engaging and effective for lessons and the classroom. Come and investigate apps and websites (kahoot, padlet, geogebra, plickers, robertkaplinsky.com, etc) that will aid in lesson design and classroom engagement.

Target Grade Level: TK - Middle

---

Session Title: Getting Started with STEM by Introducing Engineering in the TK-12th Grade Classroom

Presenter: Karin Barone, NBCT - La Veta Elementary School, Orange Unified School District

Session Description: Engineering is the natural place to start with STEM and get a jump start on the Next Generation Science Standards (NGSS). This workshop will provide easy to implement strategies to get K-6<sup>th</sup> grade teachers started with engineering and plenty of sample project ideas to take back to school and share with your colleagues.

Target Grade Level: TK – 6

---

Session Title: Using Textual Evidence to Support a Claim

Presenters: Victoria Curtis - Vista Visions Academy - Vista Unified School District

Session Description: Learn strategies to help students support their ideas with evidence. Focuses on Listening/Speaking and Writing skills. Great for ELs (and all students).

Target Grade Level: 3-12

---

Session Title: Defending Your Argument

Presenters: Theresa Buggage - Canyon Springs High School, Moreno Valley Unified School District

Raúl Miranda - Great Oak High School, Temecula Valley Unified School District

Session Description: Focus on student learning through CCSS and NGSS Instructional Shifts. Use marking the text strategies as a starting point for deeper learning activities that address all DOK levels. Strategies include numbering paragraphs, chunking text to read, and charting in the margins to define an author's claim and defend arguments.

Target Grade Level: K-12

## **BREAKOUT 2**

Session Title: Getting on the Right Track: Investigating Instructional Shifts

Presenters: Leslee Milch, NBCT - Gilbert Elementary, Buena Park School District

Jenny Hitchcock Ed.D. - James Guinn Elementary, Anaheim City School District

Session Description: Zoom in on listening, speaking and academic language via CCSS Instructional Shifts and connect with the ELA Claims to take away instructional strategies to immediately implement in your classroom.

Target Grade Level: K-8

---

Session Title: Number Talks and Cognitively Guided Instruction in Math

Presenters: Sergio Gomez - Miramonte Elementary, El Monte Unified School District

Kirsten Robinson, Ed.D. - Lindstrom Elementary, Bellflower Unified School District

Session Description: Practitioners will walk away with: concrete knowledge, working samples and a clear understanding of what “Number Talks” are and how they can be implemented daily with nominal prep and minimal materials. “Number Talks” aid in building both “flexible” thinking as well as math fluency.

Target Grade Level: TK-6

---

Session Title: From At-Risk to At-Promise: Engaging Struggling Students

Presenters: Allison Carey - ACCESS Institutions - Orange County Department of Education

Al Rabanera, Ed.D. - La Vista High School - Fullerton Joint Union High School District

Session Description: Having trouble engaging your students? Do your students lack motivation? Participate in a session that will develop your students’ critical thinking skills in ELA and Math while targeting the CCSS.

Target Grade Level: High School

---

Session Title: Claims, Evidence and Argumentation in Science

Presenters: Donna Markey, NBCT - Vista Visions Academy - Vista Unified School District

Catherine Sanchez, Kolb Middle School, Rialto Unified School District

Session Description: What is a Claim? How do students find Evidence? What is Argumentation in Science? Attend this session to find the answers to these questions and more! We will work through 6 water activities that use common materials that can be adapted to any age group. You will get lesson plans and sentence frames to implement these activities in your own classes.

Target Grade Level: K-12

---

Session Title: Finding Relevance in Real-Life Nonfiction Text

Presenter(s): Tricia Hyun, Ed.D. - Parks Junior High School, Fullerton School District

Session Description: We have seen the words “relevant” and “real-life” stamped across the Common Core State Standards, but what is “relevant” and what is “real-life”? In this session, teachers will take 3 real-life topics that are relevant to the real world, and be able to use the 3 English language arts lessons in their classrooms the very next week.

Target Grade Level: 6-10

Source: “Teachers Teaching Teachers” conference schedule prepared and provided by members of the North Orange County-Fullerton ILC team.

## Endnotes

1. Instructional Leadership Corps. (2018, October). <https://mailchi.mp/f6b277f9e07c/0ernwqy6al-2215217>.
2. California Teachers Association. (n.d.). <https://www.cta.org/>.
3. National Board Resource Center. (n.d.). <https://nbrc.stanford.edu/>.
4. Stanford Center for Opportunity in Education. (n.d.). <https://edpolicy.stanford.edu/>.
5. Data drawn from 2016–17 annual report to funders, provided to the authors by SCOPE.
6. Malloy, C. L., Coddington, C., & Rodman-Alvarez, S. (2017). *ILC mid-project evaluation report*. Los Angeles, CA: Vital Research.
7. Instructional Leadership Corps. (2018, May). Update on the Instructional Leadership Corps. Stanford, CA. <https://mailchi.mp/ce9c88bade31/0ernwqy6al-2215173?e=1128dee5fb>.
8. Vital Research. (n.d.). <https://vitalresearch.com/>.
9. Malloy, C. L., Coddington, C., & Rodman-Alvarez, S. (2017). *ILC mid-project evaluation report*. Los Angeles, CA: Vital Research.
10. The CAASPP assesses students in grades 3–8 and 11 in English language arts and mathematics.
11. State science testing on the Standardized Testing and Reporting assessment system was discontinued in 2014 as the state transitioned to the Next Generation Science Standards and developed the new California Science Test.
12. Harris, A. (2005). Teacher leadership: More than just a feel-good factor? *Leadership and Policy in Schools*, 4(3), 201–219; York-Barr, J., & Duke, K. (2004). What do we know about teacher leadership? Findings from two decades of scholarship. *Review of Educational Research*, 74(3), 255–316.
13. Freelon, R., Bertrand, M., & Rogers, J. (2012). Overburdened and underfunded: California Public Schools amidst the great recession. *REMIE Multidisciplinary Journal of Educational Research*, 2(2), 152.
14. Rogers, J., Fanelli, S., Freelon, R., Medina, D., Bertrand, M., & Del Razo, M. (2010). *Educational opportunities in hard times: The impact of the economic crisis on public schools and working families*. Los Angeles, CA: Institute for Democracy, Education, and Access, UCLA.
15. Griffith, R. (2008). The impact of a scripted reading program on teachers' professional spirits. *Teaching & Learning*, 22(3), 121–133.
16. Shambaugh, L., Kitmitto, S., Parrish, T., Arellanes, M., & Nakashima, N. (2011). *California's K–12 education system during a fiscal crisis*. San Mateo, CA: American Institutes for Research.
17. Proposition 30 was a 2012 California state bill that enabled temporary taxation for educational funding.
18. McLaughlin, M., Glaab, L., & Carrasco, I. H. (2014). *Implementing Common Core State Standards in California: A report from the field*. Stanford, CA: Policy Analysis for California Education. <https://files.eric.ed.gov/fulltext/ED564292.pdf>.
19. Malloy, C. L., Coddington, C., & Rodman-Alvarez, S. (2017). *ILC mid-project evaluation report*. Los Angeles, CA: Vital Research.
20. Darling-Hammond, L., Hyler, M., & Gardner, M. (2017). *Effective teacher professional development*. Palo Alto, CA: Learning Policy Institute.
21. Darling-Hammond, L., Hyler, M., & Gardner, M. (2017). *Effective teacher professional development*. Palo Alto, CA: Learning Policy Institute.
22. Malloy, C. L., Coddington, C., & Rodman-Alvarez, S. (2017). *ILC mid-project evaluation report*. Los Angeles, CA: Vital Research.
23. OECD. (2014). *TALIS 2013 results: An international perspective on teaching and learning*. Paris, France: OECD Publishing.
24. Jaquith, A. (2017). *How to Create the Conditions for Learning: Continuous Improvement in Classrooms, Schools, and Districts*. Cambridge, MA: Harvard Education Press.

25. Wagner, T. (2014). *The Global Achievement Gap: Why Even Our Best Schools Don't Teach the New Survival Skills Our Children Need—And What Can Be Done About It*. New York, NY: Basic Books.
26. Harris, A. (2005). Teacher leadership: More than just a feel-good factor? *Leadership and Policy in Schools*, 4(3), 201–219.
27. York-Barr, J., & Duke, K. (2004). What do we know about teacher leadership? Findings from two decades of scholarship. *Review of Educational Research*, 74(3), 255–316; Harris, A., & Muijs, D. (2004). *Improving Schools Through Teacher Leadership*. Berkshire, England: McGraw-Hill Education.
28. Hargreaves, A., & Fullan, M. (2012). *Professional Capital: Transforming Teaching in Every School*. New York, NY: Teachers College Press.
29. Lieberman, A., Campbell, C., & Yashkina, A. (2016). *Teacher Learning and Leadership: Of, By, and For Teachers*. New York, NY: Taylor & Francis Group; Hargreaves, A., & Fullan, M. (2012). Leadership from the middle. *Education Canada*, 55(4).
30. Darling-Hammond, L., Furger, R., Shields, P., & Sutchter, L. (2016). *Addressing California's emerging teacher shortage: An analysis of sources and solutions*. Palo Alto, CA: Learning Policy Institute.
31. California Department of Education. (n.d.). Ed-Data, Madera Unified. <http://www.ed-data.org/district/Madera/Madera-Unified>.
32. California Department of Education. (2017). CAASPP test results for English language arts/literacy and mathematics. <http://caaspp.cde.ca.gov/sb2016/default>.
33. California Department of Education. (n.d.). Data from Ed-Data.org. <http://www.ed-data.org/> (accessed 05/16/18).
34. California Department of Education. (n.d.). Data from Ed-Data.org. <http://www.ed-data.org/> (accessed 05/16/18).
35. Interactive science notebooks are practical and widely adopted tools. Using their interactive science notebooks, students write down information given by the teacher or gathered from other sources on the right side of a (spiral) notebook. On the left side, students document the ways in which they make sense of the information gathered on the right side. By periodically reviewing the students' notebooks and providing feedback, teachers have opportunities to assess individual progress as well as to communicate with the student's parents or guardian.
36. See <https://bscs.org/bscs-5e-instructional-model> for more information on the BSCS 5E instructional model (Engagement, Exploration, Explanation, Elaboration, and Evaluation).
37. Silicon Valley Education Foundation. (n.d.). East Side Alliance. <https://www.svefoundation.org/esa/>.
38. SBAC (Smarter Balanced Assessment Consortium) questions refer to the Common Core-aligned questions that appear on the California Assessment of Student Performance and Progress (CAASPP) and are intended to more closely assess students' analytical thinking, problem-solving, and communication skills than previous state tests.
39. Humphreys, C., & Parker, R. (2015). *Making Number Talks Matter: Developing Mathematical Practices and Deepening Understanding, Grades 4–10*. Portland, ME: Stenhouse Publishers.
40. California Department of Education. (n.d.). Ed-Data, Alum Rock Union Elementary. <http://www.ed-data.org/district/Santa-Clara/Alum-Rock-Union-Elementary> (accessed 08/03/18).
41. See Green, J. (2018, January 18). San Jose: Alum Rock parents rally in support of superintendent. *Mercury News*. <https://www.mercurynews.com/2018/01/18/san-jose-alum-rock-parents-rally-in-support-of-superintendent/>.
42. Further information on the Standards for Mathematical Practice is available at: <http://www.corestandards.org/Math/Practice/>.
43. See Meyer, D. (2011, May 11). The three acts of a mathematical story. [Blog post]. <http://blog.mrmeyer.com/2011/the-three-acts-of-a-mathematical-story/>.
44. Further information on the instructional shifts is available at: <https://www.cde.ca.gov/re/cc/ccssguide.asp>.
45. For an example of number talks, see: <https://www.youcubed.org/resources/stanford-onlines-learn-math-teachers-parents-number-talks/>.

## About the Authors

**Dion Burns** is a Senior Researcher on LPI's Deeper Learning and Educator Quality teams, where he conducts qualitative and quantitative research on issues of educational equity. Previously, he co-authored of *Empowered Educators: How High-Performing Systems Shape Teaching Quality Around the World*. He has more than 20 years of experience in education and has served in a variety of roles, including teaching, policy analysis, and international diplomacy.

**Linda Darling-Hammond** is President of the Learning Policy Institute and Charles E. Ducommun Professor of Education Emeritus at Stanford University, where she launched the Stanford Center for Opportunity Policy in Education and sponsored the Stanford Teacher Education Program, which she helped to redesign. She is former President of the American Educational Research Association and a member of the National Academy of Education and the American Academy of Arts and Sciences. She has conducted extensive research on issues of teaching and teacher development. Among her most recent publications are *Empowered Educators: How High-Performing Systems Shape Teaching Quality Around the World* and *Teacher Preparation for Deeper Learning*.

**Rachel Lotan** is Professor Emerita of Education at Stanford's Graduate School of Education, where she directed the Stanford Teacher Education Program for 15 years. Her teaching and research focus on academically and linguistically diverse classrooms, as well as teacher education. She is Director of the Program for Complex Instruction at the Stanford GSE. She is a co-author of *Working for Equity in Heterogeneous Classrooms: Sociological Theory in Action* and *Designing Groupwork: Strategies for the Heterogeneous Classroom*.



1530 Page Mill Road, Suite 200  
Palo Alto, CA 94304  
p: 650.332.9797

1301 Connecticut Avenue NW, Suite 500  
Washington, DC 20036  
p: 202.830.0079

@LPI\_Learning | [learningpolicyinstitute.org](http://learningpolicyinstitute.org)

The Learning Policy Institute conducts and communicates independent, high-quality research to improve education policy and practice. Working with policymakers, researchers, educators, community groups, and others, the Institute seeks to advance evidence-based policies that support empowering and equitable learning for each and every child. Nonprofit and nonpartisan, the Institute connects policymakers and stakeholders at the local, state, and federal levels with the evidence, ideas, and actions needed to strengthen the education system from preschool through college and career readiness.