



Profiles of Three Communities Working to Improve
Outcomes for Early Learners in Mathematics:

Implications for Policymakers, Education Leaders and Funders



The California-based Heising-Simons Foundation has had a longstanding focus on strengthening early learning and improving outcomes for the state's youngest children. As part of this commitment, it has begun exploring the roles of students' early success and engagement in mathematics; research suggests they may be the strongest predictors of future student achievement. The long-term goal of the foundation's "[Creating Coherent Early Math Instruction in California](#)" initiative is to ensure that students from families with low incomes and children of color are appropriately challenged and supported in math instruction in the early years of school to reach proficiency by fourth grade. The term "early math" can generally include any formal or informal mathematics instruction or learning for children from birth to age 8.

To help grantees, state and local education leaders, and colleague foundation leaders [understand ways to create a strong start in math for early learners](#), the foundation asked Education First to profile noteworthy early math efforts already underway and identify possible implications for efforts in California.

Education First identified [three communities](#), each with its own unique emphasis on improving early mathematics:

- + The Fresno County office of education (the Fresno County Superintendent of Schools) in central California.
- + The Hawthorne School District in Los Angeles County.
- + A district network in south King County in Washington state (Federal Way, Highline, Kent, Seattle and Renton school districts working with the Puget Sound Educational Services District [PSESD]).

Drawing from each community's experiences and strategies, [the profiles describe elements important to improving early math success](#).

A SHIFT IN MATH EXPECTATIONS FOR STUDENTS

Each profile examines a different approach to improving early math success, including:

1. Helping educators who work with children younger than 5 become more effective teachers (Fresno County).
2. Implementing intensive coaching and ongoing professional development practices aligned to Common Core math standards that help elementary school teachers improve student achievement (Hawthorne School District).
3. Authentically engaging nonwhite parents, especially those newly arrived as immigrants with their own cultural histories, as active partners in their children's early learning in mathematics (King County).

In addition, the profiles showcase three different leverage points for leading changes to early mathematics: a county office of education, a single school district and a collaboration or network of multiple school districts.

In selecting communities, Education First looked for evidence (even if tentative) that educators' efforts to improve early mathematics were contributing to improved student learning. Also, all three profiled communities place an explicit emphasis on high-quality mathematics instruction for all children, including their youngest learners.

Finally, notwithstanding the deliberate narrative focus of each profile, all communities employ a comprehensive set of tactics to improve student learning in the earliest years. Although the five school districts in south King County are now focused on family engagement, they continue with efforts to improve teacher skills and knowledge in math, for example. Although the Fresno County Superintendent of Schools has prioritized improving the instruction of providers outside school systems, the county office also works with early educators and supports family engagement in the districts it serves. And, although the Hawthorne School District employs coaches to help its teachers address the demands of Common Core math expectations for student learning, it engages families and provides math resources to use at home among other strategies to improve math outcomes for students.

THE FRESNO COUNTY SUPERINTENDENT OF SCHOOLS

"A lot of early childhood people don't think of themselves as math teachers," says Paul Reimer of the AIMS Center for Math and Science Education, an organization that helps Fresno County early education teachers improve their ability to teach mathematics well. Others working in the field of early learning agree with Reimer: "A lot of early learning teachers don't think they have math strengths," one California advocate for early learning observed.^[1]

One obstacle in the field to boosting the quality of math instruction for early learners is that many more preschoolers and children younger than 5 are educated in settings outside the formal public education system, including in-home early care and education provided by friends, family and neighbors. For example, Data from Kids Count, the most recent annual report on child well-being in the United States, estimated the average percentage of children ages 3–4 enrolled "in school" between 2015 and 2017 totaled only 5 percent.^[2] (Kids Count defines schools as nursery school, preschool or kindergarten and is inclusive of programs

sponsored by federal, state or local agencies, including Head Start programs.)

When early education teachers work in a school district as part of a formal school-based preschool or transitional kindergarten program, they have access to supports and tools from district and county offices to help them build their math skills and confidence. However, since much of the early education labor force works outside the formal K12 system in a variety of settings and with varying quality, these teachers regularly do not have the same access.

Confronting this reality, the Fresno County Superintendent of Schools has focused explicitly on reaching educators in these other settings and not just those working in school-based programs. And its support for these educators includes guidance on teaching math concepts well to early learners, boosting the early math confidence of early learners, and building skills to teach language, literacy and other areas important to healthy child development.

[1] Education First interview for the Heising-Simons Foundation, May 2019.

[2] [Young children are not in school in California](#). Kids Count Data Center, The Annie E. Casey Foundation.

“Fresno County has prioritized early educators [working outside of school systems],” says Lupe Jaime-Mileham, the county office’s senior director of early care and education, referring to the myriad learning opportunities the county office of education offers to early learning educators around the community. As the profile on these efforts details, the county education office delivers services to these educators through four primary vehicles:

1. Fresno Pacific University’s AIMS Center for Math and Science Education is staffed by former teachers and provides coaching, specialized training and demonstration lessons solely to early education educators. The emphasis is on finding naturally occurring opportunities for children to learn math. The center worked closely with 25 Head Start teachers and directors during the 2017–2018 and 2018–2019 school years and is engaging in a third engagement in 2019–2020 with the intent of further expanding its efforts. Head Start teachers and directors serve nearly 3,000 children across Fresno County.
2. Fresno County Superintendent of Schools’ STEM Department offers a regular series of learning opportunities open to all early learning teachers, including private providers working with children from birth to age 5. Many of the offerings—which have included geometry for early learners, shapes, number sense and counting collections—are delivered on Saturdays or in the late afternoon on weekdays and at minimal cost for participants (no more than \$15.00 per class).
3. The Fresno County Superintendent of Schools manages Early Stars, which serves licensed childcare centers, family home-care providers and families, and friends and neighbors working with children from birth to age 13. Its mission is to increase the quality and accessibility of early care and education throughout Fresno County. It does this by promoting the continuous improvement of providers and helping licensed facilities achieve higher ratings through the state Quality and Improvement Rating System (QRIS), or Quality Counts California, via high-quality professional development offerings in mathematics and other important child development and education topics.
4. The Lighthouse for Children Child Development Center (CDC) is a demonstration preschool plus innovation lab for early childhood professionals that is managed by the Fresno County Superintendent of Schools. It offers observation areas, on-site training opportunities and institutes and a streaming video of live instruction for practitioners to watch and learn from. It also works in close partnership with the AIMS Center and Fresno County STEM Department to develop targeted supports for educators in early mathematics.

To learn more about the Fresno County Superintendent of Schools’ approach to early mathematics, read its profile here [\[insert link\]](#).

FRESNO BY THE NUMBERS

the fifth most populous city in the state

32

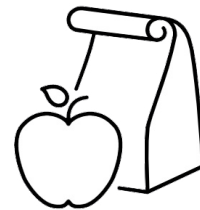
school districts



204,000+ students

74%

of whom receive free or reduced cost meals



According to state tests, about one-half of third-graders across districts in Fresno county meet grade-level standards in math (mirroring the state average, also at about 49 percent). However, the county’s low-income students outperform the state average for low-income learners by nearly 4 percentage points: 41 percent versus 37 percent.

THE HAWTHORNE SCHOOL DISTRICT

Hawthorne School District, located in the flight path of Los Angeles International Airport, serves close to 9,000 children from pre-kindergarten through twelfth grade, a population that is 71 percent Hispanic and 21 percent black. Thirty percent of its students are English-language learners. The district is achieving outsized results in mathematics, especially for students in third grade (which is the first year students are tested statewide on how well they meet math expectations).

Adopted nearly a decade ago by California education leaders to guide teaching and learning in the state, Common Core standards spell out a 21st-century vision for what students should know and be able to do in mathematics, and they challenge decades of conventional teaching practices in this subject. For example, the standards expect students to be mathematical thinkers, able not only to use memorized formulas but also to understand why the algorithms applied to different solutions work. This change from outdated approaches to teaching mathematics has proven difficult to operationalize at scale, and progress in many California districts has been slow.

In the Hawthorne School District, however, success in changing assumptions about what and how students learn in math and in improving student achievement has been more evident. Shortly after California adopted the Common Core math standards, school leaders committed to providing teachers with significant guidance and help in changing their practices to support the new expectations. They also paid attention to the early grades and how to begin building more computational fluency and student capacity for problem-solving in young learners as the foundation for future success in math.

As described in its profile, the district provides significant content-based coaching of mathematics teachers, with one coach assigned to each elementary school (an uncommon

“ In kindergarten through second grade, we are working hard to set the foundation for mathematical discourse, for students to have meaningful conversations about math. ”

—Erika Ayala, director of educational services, the Hawthorne School District [3]

commitment of resources among school districts). The district also regularly organizes teams of district and school leaders and math coaches to visit every classroom in each school to pinpoint teacher development needs and opportunities for improved teaching in math.

In particular, tapping expertise at the Math Project at the University of California-Los Angeles (UCLA) Graduate School of Education and Information Studies and from other researchers, district coaches have encouraged “student discourse” as a key strategy for helping students learn and apply math. Student discourse is a teaching strategy that asks students to test different problem-solving approaches and to discuss results with peers, rather than having a teacher provide direct, step-by-step instruction on a sole method to use. The strategy has two goals, according to Hawthorne’s coaches: First, to challenge students to understand the underlying concepts better and why different and sometimes multiple problem-solving approaches work and why others do not. Second, to help students build their confidence in figuring out problems on their own, using their own understanding of math, rather than simply memorizing algorithms to apply.

Starting in the third grade, the results of the school district’s approach manifest: During the 2017–2018 school year, the percentage of third-graders from economically disadvantaged families meeting state standards nearly matched the performance of all students. At 52 percent, it was 15 points higher than the statewide average for low-income third-graders and even bested the statewide average for all third-graders.

To learn more about the Hawthorne School District’s approach to early mathematics, read its profile here [insert link].





SOUTH KING COUNTY IN WASHINGTON STATE

In 2012, five school districts in under-resourced neighborhoods of south King County (in Washington state's Puget Sound region) and the umbrella, local educational service agency began working together on an initiative to increase the pedagogical knowledge and skills of their early learning educators. Their shared goal was to improve student achievement in math, especially for historically marginalized students in preschools and elementary schools. Over time, project leaders came to see that supporting teaching quality alone was not sufficient; missing from the strategy was an effort to engage parents and families as authentic partners in teaching math to young learners and the ability to recognize and adapt to the unique cultural approaches different families bring to using math.

As this network's profile details, families whose voices are absent from school planning and parent meetings are more often families of color and new immigrants. Greta Bornemann, the PSESD director of mathematics, is troubled by that finding because the demographics of southern King County between Seattle and Tacoma have changed substantially.^[4] Project leaders have explained that educator messages and attitudes about math expectations often stifled true family engagement, especially for families with nonwhite members. Furthermore, they perpetuated institutional racism.

Bornemann adds that one significant reason many children of color struggle in math is that educators often perceive families of color as working from a deficit of math knowledge.

The result of any engagement effort should be giving families authentic opportunities to add their voices to conversations about how to improve outcomes for their children.

A six-person steering committee oversees the early math initiative across the districts and supports the work of two networks that function as learning communities:

1. A Professional Learning Network of district coaches and others leading professional development for math teachers; and
2. An Implementation Network of district math leaders and curriculum directors, community partners and parents.

Over the past two years, the initiative and its two networks have focused their efforts more directly on changing mindsets about family engagement and cultural biases of the coaches, trainers and school leaders who work most directly with teachers.

After exploring topics such as how non-Western indigenous peoples practice mathematics and how to eliminate deficit-thinking, members of both networks have been armed with greater knowledge and a greater commitment to social justice. They are starting to educate others in their districts by helping them consider ways they engage families from different cultures, whether or not they listen to and learn

[4] Education First interview for the Heising-Simons Foundation, May 2019.

from them, and if they view them as assets to their children's education. Network members sit on district teams charged with advancing family engagement work in their individual districts, developing strategies based on what they have learned in the networks to bring greater family voice to efforts to improve early math.

It is too early for efforts to show up in third-grade math scores, and some of the five districts are further along than others in working directly with classroom teachers. Bornemann reports that a qualitative evaluation from summer 2019 suggests that the work has been challenging: Some educators found specifically focusing on racial equity difficult and still

find that partnering with families to set goals for their children and design learning opportunities is awkward. However, evaluators also found progress in many classrooms, with preschool and elementary school teachers beginning to develop relationships with families and communities and to shift their engagement approaches from telling parents what they should do to listening to them, making them feel welcome in schools, and valuing the contributions they make to the teaching and learning of mathematics in the early years.

To learn more about the south King County approach to family engagement in early math, read its profile here [link].

IMPLICATIONS FOR CALIFORNIA POLICYMAKERS, EDUCATION LEADERS AND FUNDERS

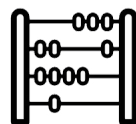
As noted above, each profile is designed to showcase a specific and different approach to improving early mathematics.

For south **King County**, implementing a family engagement effort to address institutional racism that inhibits school systems from working with families of color as equals.



For the **Hawthorne School District**, providing teachers with significant support and help in changing practices and boosting student confidence to achieve the math expectations established by Common Core state standards.

For the **Fresno County Superintendent of Schools**, improving the mathematics instruction of students from birth to age 5 outside of school systems, such as in Head Start programs or home-based care.



Looking across these profiles, Education First has identified **four implications** that policymakers, education leaders and funders should consider as they work to improve math outcomes for California's early learners.



IMPLICATION #1:

BUILD ON THE CULTURAL ASSETS OF FAMILIES OF COLOR TO SUCCEED AT EARLY MATHEMATICS LEARNING

As the overall California student population grows more diverse and, in many urban and rural communities, poorer, the south King County profile reinforces certain imperatives as part of any serious effort to improve math achievement. Teachers and education leaders must pay greater attention to cultural differences among students, parents and teachers, implicit and explicit biases for how math is learned, and institutional racism embedded within education systems, including how educators traditionally have worked with families.

As leaders of the south King County early math initiative have come to understand, despite a commitment to hold high expectations for students and educators in math, achievement gaps persist between children of color and their white counterparts. This reality has pushed early math advocates in this region of the Puget Sound to attend to a more challenging barrier to student success: how to engage parents of different

cultures as true partners and leverage their own approaches to doing math at home in the effort to support student learning. This is a difficult realization to come to and even more difficult to address across school systems because, as a member of the south King County early learning steering committee suggests, it asks everyone involved to examine their own beliefs and how those beliefs impact their work with children and families.

Thus, advancing “early mathematics,” especially in a state such as California—where dual-language learners and learners from a range of cultural backgrounds constitute the majority of children below the age of 8—can’t be solely about improving the quality of teaching and the quality of materials. While those things matter greatly, educators need to find new ways of tapping the cultures and values of students and parents in identifying solutions and crafting instructional approaches.

IMPLICATION #2:

EXAMINE AND ENHANCE EXISTING EFFORTS OR DESIGN NEW EFFORTS TO HELP TEACHERS ADOPT PRACTICES THAT FOSTER STUDENTS’ CONCEPTUAL UNDERSTANDING OF MATHEMATICS AND MEET COMMON CORE STATE STANDARDS

Moving from the conventional teaching practice of emphasizing the memorization of formulas to helping students build conceptual understanding and become mathematical thinkers has been difficult despite ongoing professional learning efforts to support them. Efforts to implement new teaching practices are likely exacerbated first by what the principal of Washington Elementary School in the Hawthorne School District profile notes is a lack of readiness among some teachers to explore new mathematics instructional strategies tied to the Common Core. In addition, as the Fresno County Superintendent of Schools profile suggests, efforts are likely hampered by the poor view many early learning mathematics teachers have of their own mathematics abilities—and even math itself. Early learning teachers often do not think of themselves as math teachers or believe they have “math strengths,” and, according to one professional development provider for early learning educators in Fresno County, do not even like the discipline. Preschool teachers in particular lack confidence and are not prepared to teach math, according to some experts.

To help more early learning teachers develop their confidence as mathematics instructors and understand and implement effective early math strategies, they need comprehensive supports, such as those that the Hawthorne School District provides to its teachers from preschool through middle school and that the Fresno County Superintendent of Schools provides early learning educators outside of school systems.

Hawthorne, for instance, uses Local Control and Accountability Plan (LCAP) funds to resource a math coach in every elementary school, provides those coaches with extensive training and expects them to meet regularly with school teams to use observation and achievement data to improve instruction. School leaders, math coaches and external professional development providers also regularly conduct classroom walk-throughs to identify strengths and areas for instructional growth, using that information to inform the supports teachers receive.

County offices of education seeing poor or uneven results

across the districts they serve (and school districts seeing the same across schools they oversee)—even if they are already engaged in efforts to improve the math instruction of early educators—face difficult questions: To what degree are teachers consistently utilizing instructional strategies that yield multiple approaches to problem-solving among students and enhance their conceptual understanding of mathematics? How have districts and schools, especially those with high fidelity to strategies that yield conceptual understanding of mathematics for early learners coupled with strong results, advanced teacher understanding and implementation of

strong mathematics instructional strategies? How do these districts and schools resource these strategies?

Emerging from these questions could be answers to these questions could yield new, enhanced and a more comprehensive set of strategies to build mathematics confidence among early learning teachers and improve their practice. Without these, it will be difficult to move the bar for math outcomes for children entering kindergarten and third grade students sitting for the state assessment.

IMPLICATION #3:

IMPROVE STUDENT LEARNING IN INFORMAL ENVIRONMENTS OUTSIDE FORMAL PRESCHOOL AND K12 SYSTEMS BECAUSE MOST 3- AND 4-YEAR-OLDS ARE LEARNING EARLY MATHEMATICS FROM PARENTS AND IN-HOME CHILDCARE PROVIDERS.

Even if K12 school leaders embed preschool programs in all their elementary schools and successfully help those students transition to kindergarten-ready in math, the profiles remind us that the majority of students showing up for elementary school have attended preschool in other, less formal learning environments or not at all. This reality presents a substantial challenge to school system leaders who are working to make sure all children show up “kindergarten-ready” when they start school. For this reason, successful early math efforts need to attend not only to in-school improvements but also to improvements in other community settings for early learners.

For example, many educators in “family and friends” early learning environments lack access to any supports to become more effective instructors of mathematics. “If we’re going to prioritize the earliest of learning in math, we have to go where the students are, and that’s often outside organized systems,” says Lupe Jaime-Mileham, the senior director of early care and education for the Fresno County Superintendent of Schools. More school districts or county offices of education could mirror Fresno County’s concerted effort to bring expansive and creative ways of strengthening the math skills of educators who are where “the students are.”

IMPLICATION #4:

GENERATE MORE DATA THAT HELP EDUCATORS AND SYSTEM LEADERS MAKE BETTER DECISIONS

Gaps in data—including details about how well different students are learning, especially those in early education systems, and which students are ready for kindergarten—are significant in California. The state collects and connects few data about students as they move through different education settings (although Governor Newsom, who took office in January 2019, has made creating a “longitudinal data system” a priority). Also, the state has no agreed-on standard for what “school-readiness” in math looks like for new kindergartners. The Hawthorne School District profile in particular suggests that community and school leaders need better, more consistent data if they are to successfully support early learners, measure the effectiveness of their efforts to improve the quality of math instruction inside and outside K12 systems and set wise policy and budget priorities.

For example, the current lack of a strong kindergarten-readiness tool hampers efforts by California school districts and county offices of education to improve teaching quality of early learning educators, including those working outside the K12 system. Not easily answered questions in most communities include: Are more students now showing up to kindergarten ready to learn mathematics (as well as other disciplines)? What approaches in the early years seem to be making the greatest difference for students?

California has not adopted or promoted the use of such an assessment, leaving it up to school districts or county offices to develop and adopt their own. In addition to creating a common, high-quality, useful readiness assessment, any efforts in the state to revise QRIS standards should align those standards to this new tool.



The [Heising-Simons Foundation](#) is a family foundation based in Los Altos and San Francisco, California. The foundation works with its partners to advance sustainable solutions in climate and clean energy, enable groundbreaking research in science, enhance the education of our youngest learners and support human rights for all people.



[Education First](#) is a national, mission-driven strategy and policy organization with deep expertise in education improvement. Its mission is to deliver exceptional ideas, experience-based solutions and results so all students—particularly low-income students and students of color—are prepared for success in college, career and life.

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