

Build Coherent HQIM Systems to Improve Math Learning

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According to the National Assessment of Educational Progress (The Nation's Report Card, 2022), only a little more than half of U.S. 8th graders can successfully order the following numbers from least to greatest: 0.75, $\frac{1}{2}$, $\frac{1}{10}$, and 0.25. This is troubling for many reasons. Having a solid grasp of rational numbers is critical to being successful in algebra, a gateway to more advanced high school course offerings, as well as to navigating daily life. This problem is not from a lack of attention. Elementary and middle school curricula give plenty of attention to rational numbers, including questions like this NAEP example.

One argument for why too many 8th graders still struggle with rational numbers is that they experience mathematics as a set of disconnected skills and facts rather than as a coherent, conceptual whole. Students who struggled with this problem might have learned the procedure for converting fractions to decimals (and vice versa). But they had limited opportunities to build and reinforce an understanding of the underlying concepts with a visual representation such as a number line or through real-world examples.

For the past decade, math education reformers have responded to this issue by encouraging curriculum publishers to develop high-quality instructional materials (HQIM) that attend not only to skill development but also to conceptual understanding and application. Independent organizations, such as EdReports, provide free ratings of curricula on their alignment with these quality features to inform state and local policymaking and purchasing decisions.

Many states and collections of states (e.g., the Council of Chief State School Officers) now view the adoption and implementation of HQIM as an important lever for improving student learning, which remains the North Star of any instructional improvement initiative. However, most recently, state and district leaders are moving beyond adopting a core HQIM math program to establishing policies that promote coherence across core and supplemental instruction.

When there is a shared vision and alignment among all aspects of the system, educators are better positioned to collaborate productively to support student learning. It is like having a capable crew that understands the destination, their individual roles, and ways to work together to identify and address problems along the way.

This shift is important because adopting HQIM alone is not enough to improve math teaching and learning. The impact of instructional materials depends on how well they are implemented as part of a coherent instructional system—one in which core and supplemental materials, assessments, professional learning, collaboration, and leadership practices are aligned around a shared vision for student learning.

Treating student learning as the North Star driving HQIM coherence initiatives is employing a useful analogy. Before modern navigation technology, sailors used the North Star as a reliable reference point for direction and latitude, adjusting their course as needed to stay on track. They were not sailing to the North Star but rather *by* the North Star through continuous data loops. The leaders and educators carrying out HQIM coherence initiatives are constantly navigating curricular materials, assessments, and other aspects of the system to determine the extent to which students are understanding grade-level standards.

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What We Are Learning About HQIM Implementation

Like sailing in choppy waters, successfully implementing HQIM is incredibly complex. This is why it is critically important for the field to understand as much as possible about how HQIM instructional systems are implemented in different types of contexts. Across several projects with different focal areas, we (the authors of this paper) are beginning to learn some early lessons related to HQIM coherence in mathematics. One lesson is that the implementation of **HQIM should not be an end in itself but rather a critical resource for helping the district system achieve its vision** for the kinds of teaching and learning every student should have access to.

Lesson 1: Implementation Requires a Systemwide Approach

In the Math System of Measurement project, we are exploring a set of measures that, taken together, give educators and leaders signals about a vision for high-quality teaching and learning and the instructional system needed to achieve those outcomes so they can identify areas for improvement and use feedback to adapt their work.

The measurement system is built on the premise that **the productive implementation of HQIM requires coordinated multilevel processes within a district system and must center educators' capacity building.** In other words, HQIM are not simply resources to adopt. Our measurement system includes data about student learning outcomes and data on the kinds of student experiences HQIM should help provide for every student, such as rich math discourse and cognitive rigor. The system also provides information about educators' experiences of the conditions that support better teaching and learning, including teacher collaboration meetings and instructionally focused interactions with leadership. Furthermore, it includes measures of key practices at the school- and district-leadership levels, such as setting and communicating a consistent vision and solving problems around teacher needs.

However, a math measurement system is only meaningful in the context of collaborative sensemaking among educators. The core focus of this project is how the measurement system is used in ways that are meaningful to the day-to-day work of teachers and leaders and that inform their decisions and actions.

Lesson 2: Meaningful Effects May Take Time

HQIM math programs can contribute to student learning by the 2nd or 3rd year of implementation, and successful cases warrant further investigation. For example, we conducted retrospective studies of the impact of the Illustrative Mathematics (IM) core curriculum in [Massachusetts](#) (Khanani et al., 2025) and in [California's Oakland Public Schools](#) (Khanani, 2026). In both locations, schools that implemented IM in grades 6–8 for multiple years did significantly better on the state math assessment than a similar set of schools that used a different core curriculum. In Oakland, the effects were 0.40 to 0.50 standard deviations after 3 years of use, which are considered large for state assessment outcomes.

We are now launching a qualitative case study to better understand the enabling conditions and constraints of the district's math instructional system, adding to the field's broader understanding of coherent instructional systems. Specifically, the study will examine the district's vision for student mathematical learning and how leaders keep that vision at the center of their work, how teachers are trained to use the core and supplementary curricula in light of that vision, and what data are used to support student learning and continuous improvement across the system. Over the next 2 years, we will continue to publish quantitative and qualitative studies and make connections across these studies on our study's [website](#).

Lesson 3: Policy and Incentives Shape Implementation

We also started a new project this year with the Texas Education Agency (TEA) to **understand how teachers can leverage core curricula and supplemental digital resources to provide differentiated support for all learners on grade-level content**. Texas has a common statewide HQIM math curriculum for core instruction and several state-approved supplemental programs. The TEA offers financial incentives for districts to adopt a common HQIM core curriculum and optional blended learning grants for districts that want to dig deeper into how the core and supplemental curricula fit together to accelerate learning. Over the next 3 years, we will also share qualitative and quantitative findings from this state context.

How WestEd Can Help

WestEd works with HQIM product developers, states, districts, and other partners on the design, implementation, and evaluation of HQIM math programs and coherence initiatives by

- developing **review criteria and processes for selecting HQIM math programs** based on local instructional priorities and vision for math teaching and learning;
- supporting states' and districts' **design and delivery of professional learning** that promotes quality HQIM implementation;
- building measurement systems that support local leaders in **understanding bright spots and areas for improvement** in the implementation of HQIM programs and initiatives;
- evaluating the **impact of HQIM programs and initiatives on student math achievement** to inform product developers, states, and districts; and
- **facilitating communities of practice** among HQIM math product developers, state and local leaders, and other researchers focused on the implementation and impact of HQIM programs and initiatives.

Learn more about our math work and services at WestEd.org/Math.

Recommendations for Education Leaders and Partners

Advancing coherent HQIM instruction requires engagement from multiple interest holders. State and district leaders should ensure that approved supplemental resources and math assessments are aligned with the core math curriculum and their overall vision of math teaching and learning. School leaders should create consistent opportunities for teachers to plan and continuously improve HQIM implementation based on data from the products and the classroom. Curriculum developers should listen to leaders and educators about the barriers to and enabling conditions for optimal implementation of their products, and researchers should develop measures to efficiently assess how HQIM systems are operating, drawing from the perspectives of educators and students.

While each of these groups has an important role to play, moving the field forward may require new structures for collaboration. Networks like the [AIMS Collaboratory](#) incentivize collaboration among math curriculum developers, districts, and research teams. Most of the largest HQIM math curriculum developers are in this community, and many of its projects involve sharing lessons learned from across products and learning platforms. As an active member of this community, we see firsthand that collaboration among organizations that might otherwise be considered competitors is not only possible but also mutually beneficial.

If having a coherent HQIM system becomes simply a box to check off, it could become the next panacea that does not pan out. But if leaders, educators, and researchers make high-quality coherent instruction a collaborative, evidence-based effort anchored in improving student learning, meaningful progress can be made in improving math outcomes for students.

References

- Khanani, N. (2026). *The impact of the Illustrative Math curriculum in Oakland Unified: Math achievement 5 years after adoption*. WestEd. https://imes.wested.org/wp-content/uploads/2026/07/Illustrative-Math-remediation-REV_20260701-ADA-FINAL-v2.pdf
- Khanani, N., Zabala, D., Stackhouse, S., Gu, J., & Walters, K. (2025). *Impact of the Illustrative Math curriculum on math achievement: A matched-comparison study in Massachusetts*. WestEd. https://imes.wested.org/wp-content/uploads/2026/06/Impact-of-Illustrative-Math-Curriculum_RH_09-24-25-ADA-FINAL.pdf
- The Nation's Report Card. (2022). [NAEP questions tool: 2022, mathematics, grade 4, question ID: 2022-8M1 #27 M3890EM]. National Center for Education Statistics, U.S. Department of Education. <https://www.nationsreportcard.gov/nqt/searchquestions>