

ISP Joins Three School Districts to Improve Mathematics Instruction with Systems Approach Aimed at Creating Equitable Learning Environments



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NIC Convening Spring 2023

School districts can improve student mathematics learning and experiences by shifting focus from interventions aimed at improving test scores to professional learning and structural changes that increase equitable access to rigorous and joyful mathematics.

Supported by STEMpact, the Institute for School Partnership at Washington University in St. Louis (ISP) initiated a networked improvement community (NIC) with three school districts in the St. Louis region to implement district-wide, ambitious and equitable mathematics instruction. Launched in 2020, the STEMpact District Immersion (STEM DI) NIC's primary goals included:

1. Develop the capacity of district teams to initiate and sustain instructional improvement efforts faster and more reliably, for all students
2. Improve equitable student outcomes within middle school mathematics
3. Specify changes that lead to more equitable outcomes; and build and disseminate this knowledge

“The NIC provides a formalized way for educators to compare notes, share hits and misses and support one another as professionals. Even though we come from districts very different in size, resources available and students served, there are some very clear commonalities. We’ve built a community.”

– Mandy Harvell,
Ritenour School District

PROJECT SCOPE OVER THREE YEARS

The STEM DI NIC harnesses the power of a scientific learning community to support the implementation of effective practices. ISP serves as the NIC hub, connecting teams of educators from the Maplewood Richmond Heights, Mehlville, and Ritenour school districts in pursuit of a common aim: **to increase equitable access to rigorous mathematics learning opportunities and create more joyful learning experiences.**

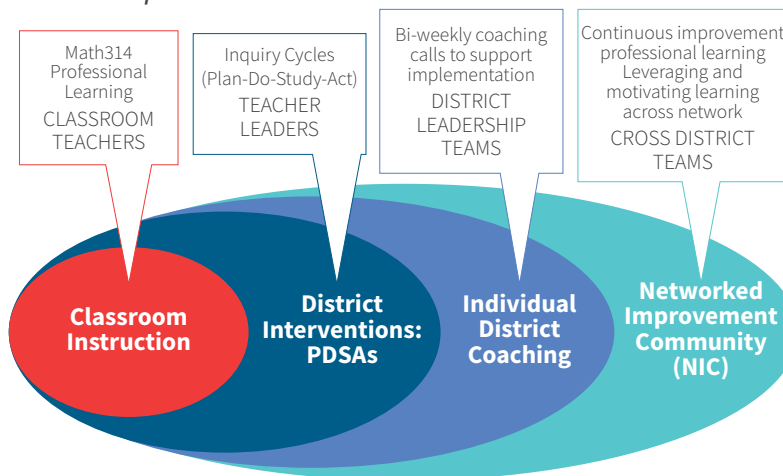
At the heart of this approach is **increasing the use of cognitively demanding mathematics tasks** that spark student interest, require discussion and collaboration, and allow for multiple solution pathways. As teachers implement these tasks in their classrooms, teams use improvement science methods to learn from variation and scale successful practices. ISP's multidisciplinary team of researchers and instructional

specialists partners with teachers, coaches and administrators from each NIC district, providing services designed to support educators at all levels of the education system. These include teacher professional development, improvement coaching, and cross-district collaboration during regular NIC convenings. District improvement teams dig deep into classroom and district practices, **leveraging strengths as they deepen their understanding of the problems that have historically prevented change.**



The NIC worked hard virtually and in-person through COVID.

NIC Participation Structures



In its first three years, the STEM DI NIC has **developed a common theory of improvement to ground the work in research-based practices, created a system of measures to evaluate this theory, and established network learning routines** as a research-practice partnership. Funding for a **fourth year of engagement has been secured** as we test how to scale improvements within districts and across the network.

RESEARCH PARTNERSHIP FOR INSTRUCTIONAL IMPROVEMENT IN MATHEMATICS

ISP’s research and analytics team investigates problems, measures the effectiveness of interventions, and guides learning about how to achieve reliable results in a variety of contexts. Our findings have influenced district decisions and helped shape the NIC’s learning goals.

Increasing access to rigor

Teacher surveys and interviews have revealed obstacles that stand in the way of increasing opportunity and equity in school mathematics. The ISP's hub team has shared these findings with district mathematics leaders and administrators and proposed high-leverage instructional system supports to alleviate these obstacles (Cobb et al, 2018). For example, teachers report using cognitively demanding tasks more often when these tasks are part of their curriculum. In order to increase equitable access to rigor, NIC districts are adopting higher quality mathematics curricula - a key step in reducing differential learning outcomes for students (NCTM, 1989; 2000; 2014). In addition to improving the quality of curricula and instructional materials, district leaders are working to improve teacher collaborative time and alignment of initiatives and accountability.

Uncovering bright spots

A NIC-wide system of measures provides opportunities to identify bright spots where improvements are happening and use these cases to inform scaling and sustaining effective practices. For example, teachers are provided with reports on their strongest areas of growth on student surveys. District teams have used these findings to identify their most successful interventions and leverage the expertise of teachers who have studied how to adapt practices for their context and provide recommendations for systems change.



NIC team members presenting at the Carnegie Summit for Improvement in Education in San Diego, March 2022.

IMPROVEMENT TOWARDS THE NIC AIM

The ISP has evaluated the impact of NIC activities, with encouraging initial outcomes:

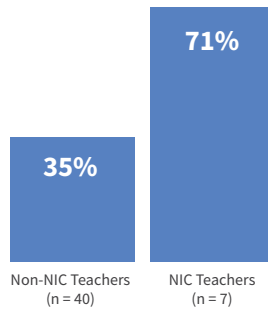
While all middle-school students' learning in NIC districts grew over the course of the 2021-2022 school year based on district benchmark assessments, **students in NIC teacher leaders' classrooms (n = 662) demonstrated significantly more growth than students of their colleagues (n = 2,948), who had participated in mathematics professional learning but not additional NIC activities.** Importantly, there were no significant differences between NIC teacher leaders' and non-NIC teachers' students' benchmark scores at the beginning of the year.

Analysis of teacher and student surveys demonstrated that NIC teacher leaders engaged their students in rigorous and equitable mathematics learning experiences more often. For example, NIC teacher leaders implemented cognitively demanding tasks more frequently than

non-NIC teachers, and their students reported engaging in discourse and collaboration more often than students in non-NIC teachers' classrooms.

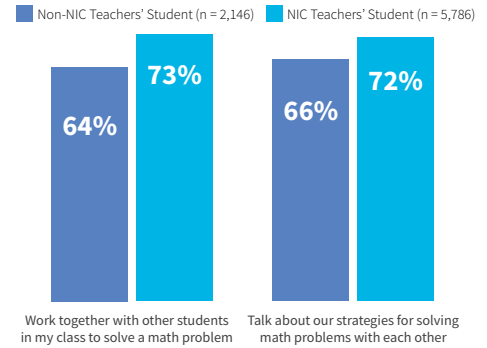
Teachers' Use of Rigorous Math Tasks

Percentage of teachers who reported using tasks either daily or weekly



Student Collaboration and Discourse

Percentage of students who reported engaging in practices most of the time or always

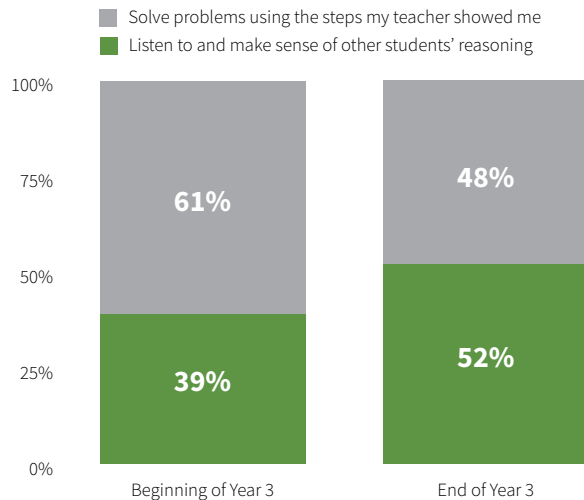


Ritenour Middle School students work together to record their thinking during small group work.

Iterative improvements in NIC teacher leaders' instructional practices are improving students' mathematics learning experiences.

For example, as teachers tested changes in their instructional practices, students' perceptions of what they needed to do in order to be successful in their math class shifted. From the beginning to the end of the 2022-2023 school year, more students reported engaging in cognitively demanding learning.

What did you need to do in order to be successful in your math class today?



ONGOING LEARNING

Analyses are planned to answer additional questions about program impact, including investigating the question: Does participating in STEM DI increase math achievement and reduce inequitable outcomes compared



to similar districts in the region who are not participating in similar programs?

As we conclude Year 3 of the program and plan for continued engagement in Year 4, we are focused on studying methods for affecting deep change in practice and scaling efforts for equity (Cohen-Vogel, Century & Sherer, 2021). This will include supporting administrators to continue to understand and remove barriers for teachers and building educators' capacity to lead improvement efforts, especially toward implementing high quality curriculum materials in the first year of adoption. We will build on district strategies for spreading learning from NIC teacher leaders to their colleagues through teacher collaborative time and department meetings. Additionally, we will continue to elevate NIC participants' learning through regional and national conferences and publications, and support NIC participants in their personal endeavors to continuously grow and move into leadership positions.

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The Institute for School Partnership is Washington University's translational arm for educational impact. The ISP partners with schools and districts to build capacity for school transformation through new approaches to leadership and deeper learning experiences for all students and educators