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# District-led School Turnaround: Aiming for Ambitious and Equitable Instruction in Shelby County's iZone

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## Abstract

The Shelby County iZone is a district-led effort to dramatically improve, or "turn around," 23 of the lowest performing schools in Tennessee in the 15th largest district in the country. Despite circumstances that have derailed many past reforms, iZone schools have made statistically significant and educationally meaningful gains in mathematics and English language arts (ELA) (Zimmer, Henry, Kho, & Viano, 2015). This report presents the findings of a multi-year research project that examined the evolution of the iZone as it shifted its strategy from school-level autonomy to one that featured a common curriculum, shared pedagogy, and collegial learning. The analysis delves into the challenges that iZone leaders, principals, and teachers confronted in coping with the needs of a student population mired in intergeneration poverty, rigorous performance standards, and a stringent accountability system. The results illuminate the importance of multi-level system re-design, continuous improvement, and compromise and negotiation among key stakeholder groups.



## Keywords

iZone


## Disciplines

Curriculum and Instruction | Curriculum and Social Inquiry | Education | Educational Administration and Supervision | Educational Leadership


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# GLOSSARY OF TERMS AND ACRONYMS

**Achievement School District (ASD)**: Tennessee's state-run school district consisting of some of Tennessee's lowest performing schools (priority schools), many of which are located in Memphis, Tennessee.

**Advisor**: An instructional coach within the Instructional Support Team who provides direct content-specific support to teachers. *Advisors were originally known as "coaches" and the terms were used interchangeably among some district staff.

**Common Core State Standards (CCSS)**: Colloquially referred to as the Common Core, these are a set of academic standards in mathematics and English language arts/literacy (ELA) based on grade-level competencies. The CCSS were developed in 2009 by the National Governors Association and Council of Chief State School Officers. Tennessee uses an adapted version of CCSS called Tennessee Academic Standards.

**Content Leads**: Teachers or school leaders assigned content-specific supervisory leadership and pedagogical support positions within their school's academic departments. Content leads often lead professional learning communities and provide individual support to teachers.

**Content Managers**: District-based staff on the Instructional Support Team with a subject area specialization. Content Managers' primary role was to support and supervise a team of advisors although they also provided direct pedagogical support to teachers and professional learning communities. In the 2018-19 school year, Content Managers were directly managed by the ILDs.

**Cycle of Professional Learning (CPL)**: A school improvement process by which ILT members observe multiple classrooms to identify instructional trends and challenges, and use the data from these observations to design professional development, inform collaboration in PLCs, and provide direct feedback to teachers.

**Eureka Math Curriculum**: A rigorous, Common Core-aligned curriculum with a central focus on mathematical concepts, productive struggle, and student discourse. Shelby County Schools began piloting Eureka Math in 2016-2017 and adopted it across all of its schools (including the iZone) in 2017-2018.

**Instructional Leadership Director (ILD)**: iZone leaders who develop and evaluate principals' instructional leadership expertise and support them in meeting external accountability targets.

**Instructional Leadership Development Team (ILDT)**: A team of instructional leadership directors (ILDs) charged with supporting teachers and school leaders.

**Instructional Leadership Team (ILT)**: A school-based leadership team usually comprised of the school principal, content leads, the PLC coach, and grade level teacher-leaders who lead the school improvement process.

**Instructional Practice Guide (IPG)**: A Common-Core aligned instructional rubric which provides a common lens for observing and analyzing instruction. Created by Achieve the Core.

**Instructional Support Team (IST)**: A cadre of content-specific instructional coaches (advisors) and their managers who worked directly with teachers to design lesson plans and address instructional challenges.

**iReady (Ready)**: A supplementary curriculum aligned to the TNReady test (see below), but considered less rigorous than the Eureka Math Curriculum.

**Leadership Playbook**: A resource developed by the Chief Academic Officer and other iZone leaders to elaborate on key pillars of school organization considered crucial to leader, teacher, and student performance.

**Memphis Teacher Residency (MTR)**: A faith-based teacher residency program based in Memphis, TN. MTR teachers receive support from the program including instructional coaching and resources.

**Opportunity to Struggle**: Opportunities for students to wrestle through math tasks and problems on their own in order to develop grit and problem solving skills.

**Practice Perfect (or Teach Me)**: Instructional rehearsals in which one or two math teachers presented portions of Eureka lessons to their colleagues and leaders (and at times advisors) who played the role of struggling students.

**Priority Schools**: The lowest-performing 5% of schools in Tennessee as designated by the Tennessee Department of Education.

**Productive Struggle**: The process of learning in which students independently grapple with new or difficult concepts that develops persistence, endurance, and creative problem solving.

**Professional Learning Community (PLC)**: School-level opportunities for teachers to meet in grade level or content teams to discuss instruction, student work, test scores, or lesson plans, etc.

**Progression Toward Mastery Rubric**: A Eureka Math resource designed to show how assessment tasks are related to curriculum standards. It includes a rubric of how student responses display progression towards content mastery.

**Shelby County Schools (SCS)**: A large urban school district serving Memphis, Tennessee and several surrounding communities.

**TNReady**: Tennessee's state-wide, end-of-year assessment.

# EXECUTIVE SUMMARY

The Shelby County iZone is a district-led effort to dramatically improve, or "turn around," 23 of the lowest performing schools in Tennessee in the 15th largest district in the country.[1] All iZone schools are located within the Memphis city limits and cater to communities beset by intergenerational poverty, social isolation, and decades of neglect. Schools entering the iZone performed in the bottom 5% on state achievement tests, and[2] more than 95% of students are eligible for free and reduced-price lunch. As daunting as these statistics are, they scarcely capture the magnitude of the challenges that confront the school leaders, teachers, and district administrators who have assumed responsibility for improving these schools.

Despite circumstances that have proved insurmountable to many past reform efforts, iZone schools have made significant gains in performance in both math and English language arts (ELA). A longitudinal evaluation of the first cohort of 11 schools found that, between 2012-13 and 2014-15, the achievement of iZone students in math and science easily outpaced that of the Tennessee Achievement School District (ASD), a more radical initiative centered on state takeover of struggling schools, new governance arrangements, and a large role for charter management organizations. A majority of those schools were also in Memphis. According to the researchers who conducted that evaluation, "iZone schools are having positive, statistically significant, and substantively meaningful effects on student achievement across all subjects … In the case of Memphis, the effects are large in math and science" (Zimmer, Henry, Kho, & Viano, 2015).

This report presents the findings of a multi-year research project that sought to understand the iZone's underlying strategy and the dynamics of implementation as teachers and leaders attempted to maintain growth, expand to more schools, and at the same time move toward more ambitious practices. Our research focused predominantly on math instruction and included a combination of surveys as well as interviews, observations, and focus groups in five case study schools (three elementary and two high schools). The results are particularly germane because, despite the national attention given to experiments like the ASD, the likeliest path to reforming most of the country's most under-performing schools goes through traditional urban districts like Shelby County (Larbi-Cherif, et al., 2019). For this reason, our analysis has implications not just for the iZone, but also for policymakers, educators, and reformers across the country seeking to tackle similar challenges.

## Initial strategy

To understand the iZone strategy one must consider both its scale and environment. Currently, the iZone includes 23 elementary, middle, and high schools, and it operates in a state that has adopted Common Core-aligned standards and assessments. But that was not always the case. In its first years, the iZone included fewer than 10 schools. Although by 2010 the state had embraced more rigorous content standards, its assessments were still aligned to an older set that were ranked as among the least rigorous in the country. With this modest size and less demanding assessments, the iZone first pursued a talent-oriented strategy that decentralized decision-making authority to each school. The iZone used financial inducements to attract the county's most successful leaders, and granted them an unprecedented level of autonomy to recruit or dismiss the teachers of their choice and determine their own curriculum, pedagogical approach, and leadership practices. School autonomy was the name of the game. Assistance from the iZone's small but carefully selected central office could readily

1 There have been three iZones in different regions in Tennessee. This report focuses exclusively on the Shelby County iZone.

2 Schools are classified as priority schools for one of two reasons: (1) being in the bottom five percent in 2015-16 and 2016-17 and not meeting the TVAAS safe harbor; or (2) having a graduation rate of less than 67 percent.

support this decentralized, school-by-school approach. And in many ways this strategy worked as intended. Three successive years of strong results provided credibility, political clout, and legitimacy. State leaders took notice, and the school board and local community rejoiced in the iZone's ability to outperform the deeply unpopular ASD.

Despite these accomplishments, iZone leaders came to see the initial strategy as having little chance of long-term success. Two factors informed this sobering analysis. First, early performance gains bred pressure to grow, and by 2017 the iZone added over a dozen more priority schools to its original group. Second, in 2016 the state of Tennessee completed its tumultuous transition to a far more rigorous set of assessments that set a higher bar for teaching and learning. The combination of increased learning expectations and larger scale quickly undermined the strategy's fundamental premise because there were simply not enough extraordinary leaders to single-handedly turnaround 23 schools, nor enough teachers to perform extraordinary feats of more ambitious instruction in what was now hundreds of iZone classrooms. The original director reflected on the dilemma this posed, and the shortcomings of their original improvement model.

> *I realized the pool was so shallow because I had not developed people.... I've run out of these great principals to pull from, and I am now in a dilemma where I don't have the human capital on the ground ready to run. I don't have a bench.*

Moreover, she continued, under the more challenging learning standards even the most accomplished leaders and teachers ***"were in for a rude awakening."***

## A design for improvement at scale

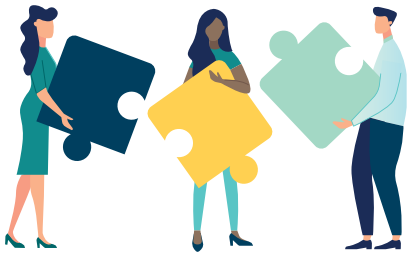
Faced with these circumstances, the iZone leadership embarked on a new strategy that is the focus of this report. In place of an emphasis on school and teacher-level autonomy, leaders attempted to build an interdependent system grounded in shared theories of teaching, learning, and improvement. The first step in this process was to establish a consistent vision of grade-level instruction coupled with a coherent strategy of how to get there. The iZone design eventually came to include interdependent aspects that we refer to as the "instructional" strategy, the "school capacity" strategy, and the "support" strategy.

- **The instructional strategy** was rooted in three central tenets: (1) conceptually focused, ambitious math content; (2) rich classroom discourse and "opportunity to struggle" as a way to engage students in problem solving; and (3) an equity orientation that expects all students to reach grade-level standards. This vision demanded a significant shift in how teachers planned for and taught math and how they managed classroom discourse.

- **The school capacity strategy** rested on the idea that fostering meaningful changes in classroom practice required commensurate changes in school leadership and organization. All iZone schools were expected to enact new structures, roles, and routines, including the following: (1) an instructional leadership team (ILT) charged with assessing teaching and learning, defining interim goals, and measuring progress; (2) professional learning communities (PLCs) intended to help deepen teachers' understanding of the state standards, the iZone curriculum, and instructional approaches; (3) math department heads and administrative leads who facilitated PLCs, served on the ILT, organized departmental meetings, observed teachers, and provided feedback; and (4) instructional "rehearsal" routines that provided teachers an opportunity to practice lessons and receive feedback from other teachers and administrators.

- **The support strategy** involved the efforts of two iZone district-level teams to guide teachers and school leaders in implementing the iZone vision. The first, the instructional support team (IST) focused on teachers' professional learning, while the second, the instructional leadership development team (ILD), helped principals integrate new leadership practices. Both teams designed programs of support that included one-on-one coaching, modeling, observing, and data analysis.

The cornerstone of all three components was a common curriculum. Eureka Math became the district's official curriculum for grades K-9 in advance of the 2017-18 school year. The importance of the curriculum was twofold. First, Eureka's focus on conceptual understanding, opportunity to struggle, and student discourse embodied the iZone's new vision of math instruction. Second, the fact that Eureka would be shared among all K-9 teachers was critical to the iZone's effort to build an interdependent system in which teachers, leaders, coaches, and iZone officials worked collaboratively in pursuit of a common mission.



## Implementation

One overarching finding of our research is that the iZone vision for classroom work and school processes clashed with deeply entrenched ideas that were rooted in longstanding ways of doing business and, in some cases, were further cemented by incentives and guidance in the larger environment. The result was a mixture of old and new that was promising in some cases but problematic in others. While the iZone made extraordinary progress in helping educators understand and value new ways of teaching math, many maintained instructional practices that reflected different, competing notions of teaching and learning. Few teachers or leaders outright rejected the new curriculum or pedagogy, but often subverted or repurposed it in ways that ranged from subtle modifications to math tasks to changes to the curriculum sequence and the introduction of more traditional curriculum material into their daily lessons.

One underlying reason for this partial embrace was that Eureka's insistence on grade-level instruction ran counter to teachers' skills and pre-existing beliefs about how to best teach struggling students. Many iZone teachers and leaders believed that they needed to spend more time directly developing procedural skills and less on the kind of conceptual mathematical knowledge and pedagogy that Eureka emphasized. Thus only 38% of teachers who responded to our survey agreed that Eureka was an appropriate curriculum for the majority of their students, and only one-quarter agreed that Eureka helped them reach students far below grade level (25%) or moved at a good pace for their students (23%).

In addition, many teachers and leaders doubted that the iZone curriculum and pedagogical approach would lead to the growth in state assessment results that they needed to make to avoid severe sanctions. Said one principal:

> *If you don't have children to pass the test, then people don't have jobs. Schools close or they're taken over by charter networks.*

However, dedicated efforts to persist and engage with Eureka could disrupt prior notions of what works for struggling students. For example, one respected math leader realized that his initial insistence on simplifying Eureka deprived students of rich opportunities to learn and excel, as he later reflected:

> *Hell, I've been killing my kids. …- I'm thinking I'm helping [my kids] by dropping [the curriculum] down a level or taking components out. I'm thinking I'm helping them, but actually, I'm harming them. The child is going to live up to the expectations that you put in place for them…And [students who we didn't think would be able to get it] actually did.*

Moreover, the iZone initiatives grounded in a common curriculum helped schools gradually become more coherent, goal-oriented organizations in which teaching and learning was made more collaborative and purposefully managed. Seen in light of historical norms of privacy, autonomy, and loose management of instruction, these findings are noteworthy.

The changes to leadership and school organization that the iZone called for also encountered a mixture of enthusiasm, wariness, and pushback. On the one hand, school leaders and teachers implemented and generally found value in the collegial structures, distribution of leadership across multiple individuals, and active engagement with teaching and learning that the school-level design attempted to establish.

On the other hand, school leaders also strayed from the core ideas of distributed instructional leadership, at times subtly undermining the central purposes of these management practices. The reasons for this varied. In one case, a hands-on principal with a high level of instructional expertise was reluctant to cede control to a leadership team that included teachers and administrators whom he thought lacked his level of knowledge and experience. Explaining his reluctance to fully embrace the iZone model, he said:

> *This is my work. I own my work. I'm not looking for a person to come in and tell me that you need to do this, this, and this…I'm the type of principal where, if you let me do my job, my teachers are going to get all of the support that they need, plus more support if you allow me to do my job. It's just really allowing me to do my job.*

In another instance, a high school principal with little content or pedagogical knowledge doubted that he had the expertise to guide his teachers towards meaningful shifts in practice, and so rather than take on the kind of instructional leadership called for by the iZone he relied on external support organizations. Another high school principal refused to press his staff to undertake new iZone pedagogies, preferring to trust teachers' own judgment. He interpreted incremental growth on the state assessment as evidence that their methods were working and that there was little reason to risk significant changes. Such conclusions were challenged by iZone leaders, particularly at the high school level where growth in assessment results did not equate to higher levels of proficiency on those same tests. Said one iZone leader, who saw this logic as undermining meaningful learning:

> *They want this magic bullet to get growth on the test…[B]ut what we're not getting is proficiency, and students deserve to be exposed to grade level work. Are we going to teach this test or do what's right for children?*

These implementation patterns point to a transition in which new ideas and practices vie for influence with previous beliefs and ways of working that have dominated in US schools for many decades. In

addition, the evidence points to the experimental nature of an enterprise that was, in good part, a do-it-yourself project for iZone leaders. While the larger environment provided some important resources, particularly for student learning, a great deal of the work was left to iZone leaders to determine on their own. Even in the best-case scenario, system-level learning and adaptation were as essential to the iZone's success as were the initial plans and strategies.

## System learning, negotiation, and continuous improvement

Two examples highlight the centrality of organizational learning and adaptation. The first regards the differing theories of teaching and learning that motivated varying responses to the iZone's curriculum and pedagogical approach. This divide was exacerbated by a policy environment that incentivized a puzzling combination of deep changes to instruction and quick fixes aimed at short-term mastery.

Over time, iZone leaders took steps to engender a shared problem definition and cultivate a common approach to implementing the curriculum that acknowledged the competing theories of teaching and learning. In 2018-19, iZone leadership acquiesced to schools' request to supplement math instruction with other curricular materials on the condition that they not become a replacement for Eureka. In addition, iZone instructional coaches worked with teachers to use curricular materials in ways that more directly supported student test preparation. Leaders recognized that if teachers were going to deviate from Eureka to prepare students for the state test, then the iZone should take steps to minimize the departure from its core instructional ideas. One instructional leader explained the rationale:

> *Our philosophy is not so much test prep as good first teaching, but we know that people are going to test prep…So, all we're doing is taking the Eureka assessment item and showing them how to transform it to a different question type. It's a compromise.*

Negotiation and compromise are critical resources for maintaining coherent systems within environments that have historically endorsed traditional forms of teaching and that send mixed messages about the wisdom of adopting new practices. The integration of a supplementary curriculum and more direct efforts to prepare students for state tests constituted a recognition that new reforms pose a risk to teachers and leaders in a high accountability environment.

The second example involves coordination between the iZone's two main support groups that provided guidance for leaders and teachers: the Instructional Support Team (IST) and the Instructional Leadership Development Team (ILD). Shortly after the expansion of the iZone, in 2017-18, iZone leadership recognized that the two groups were operating according to divergent theories of school improvement that led to conflicting guidance to schools. ILDs supported a school-level model of action in which the principal is chiefly responsible for internal processes of improvement. The ILDs' primary job, thus, was to develop principals' instructional leadership and to help them meet external accountability targets.

The IST focused on improving classroom practice of individual teachers. They worked directly with teachers to design lesson plans and address instructional challenges in ways that represented a long-term learning trajectory. They paid less attention to school-wide trends, focusing instead on specific needs of individual teachers. The IST sought to buffer teachers from the immediate press of external accountability demands that pressed for quick gains at the expense of fundamental, long-term changes to practice.

In an effort to resolve these tensions and mixed messages, in 2018-19 the iZone leadership revised the management structure by placing the IST advisors directly under the supervision of ILDs. As a result, advisors focused more on establishing and supporting school-level improvement processes than one-on-one support for teachers. This minimized conflicting messages and communicated a

single improvement strategy. At the same time, ILD teams, now squarely in charge of improvement at the school level, may each have distinctive ways of addressing instructional problems that could undermine system-level coherence within the iZone. Further, much of the improvement work now depends on department heads, content leads, and PLC teachers who have a more varied level experience and expertise with the new curriculum and pedagogy than IST advisors.

One central point that cuts across these examples is that the improvement model exists in a continuous state of imperfection. Consequently, identifying and addressing shortcomings in strategy, incoherence, and divergent theories of practice is an integral leadership function in iZone-like systems. In this sense, systemic improvement involves crafting strategies that rest on a shared problem definition that equitably distributes risk, and that engenders broad-based support among teachers and leaders.

Problem solving of this nature is a social and interactive process that requires structures and processes that enable practitioners to share experience, interpret ambiguous data, craft collective interpretations of the environment, and negotiate a common strategy to complex problems. However, collaborative work of this nature is antithetical to districts' infamously siloed structure and hierarchical culture. Moreover, district and school leaders' urgency to rapidly solve problems and quickly realize gains can foster an attitude that prioritizes action over talk. The talk that we refer to, however, is not idle chatter, but the mechanism by which pressing problems of practice are understood and managed.

## Conclusion

We close by highlighting a few central takeaways and recommendations while acknowledging that these are a modest representation of the larger set of lessons the iZone has to offer. We remind readers that the challenges and struggles highlighted in this report should not overshadow the iZone's accomplishments. The speed by which its leadership identified common goals, defined core principles of teaching and learning, assembled a talented and committed team, identified and addressed gaps in strategy, withstood leadership turnover at every level, sustained improvement on the state assessment, and made strategic compromises to enhance commitment in a high-stakes environment is nothing short of remarkable.

The iZone strategy is, itself, a central lesson about the core features of a system designed to improve schools in high-needs and high-stakes environments. As noted, the iZone strategy consists of three interdependent layers that include a model for classroom-level instruction, a model for school-level leadership and collegial learning, and a district-level model for supporting schools. School systems are multidimensional and complex, and despite the appeal of simple solutions, successful interventions require a commensurate systemic approach. That said, each of these layers must be redesigned in ways that reshapes organizational life and professional culture.

Second, systemic and ambitious change requires interdependent systems of teaching and learning for both students and district professionals. Each of these systems requires a curriculum, pedagogy, assessments, and a system of support. Each must be designed, managed, and steadily improved over

time. The iZone experience suggests that such a system can be built, but also that it is a long-term endeavor fraught with uncertainty, risk, and trial-and-error.

Third, there is also a political element to the change process, but not in the way normally associated with the word politics. The iZone strategy exposed divergent interests among groups and individuals with differing professional beliefs and interpretations of the environment. Teachers and leaders who have been successful previously were loath to risk their reputation with materials and practices that differ from what has worked for them in the past. There are powerful incentives for them to look askance at the type of changes iZone-like reforms call on them to make. Consequently, the capacity to negotiate shared problem definitions, to equitably distribute the risk of new practices, and to agree on solutions that do not alienate key constituencies is a critical resource for improvement.

We close by offering a few practical recommendations for leaders of the iZone and other systems.

- Codify key practices and routines. Practices that are inscribed in materials, routines, and operating procedures-- even if imperfect-- represent the "iZone Way'' that new teachers, leaders, and administrators can be socialized into over time, and as such, they form the curriculum around which professional learning activities are organized. Further, codification reduces dependency on individuals in a district with high turnover, and while not a substitute for individual expertise, can soften the blow of the inevitable departure of teachers and leaders.

- Construct and nurture collegial structures within and across work groups. The communication these groups afford are critical for maintaining coordination and coherence within an interdependent system and in an environment that can foster competing theories of teaching, learning and improvement. Collegial structures ensure that new ideas spread across schools and work groups, and help to prevent individual units from gradually drifting into markedly different ways of working. Moreover, they function as mini R&D units that devise novel solutions to previously unaddressed or poorly understood problems.

- Ensure the equitable distribution of risk associated with new instructional approaches. The high stakes environment in which the iZone resides can discourage practitioners from integrating new practices that take time to master and may not improve test scores in the short term. iZone leaders can encourage teachers and leaders to embrace more ambitious practices by rewarding efforts to engage in professional learning, enact new practices, and make incremental progress.

- Build support among civic and business leaders, parents, and community organizations. Educational environments are notoriously turbulent and fickle as policies change, funding priorities shift, and reforms de jour emerge. Broad-based community support that incorporates multiple stakeholder groups can buffer the iZone from the instability of a turbulent environment, and ensure that it survives leadership changes at the district and state level.

We offer these suggestions because we see the iZone as a thoughtful and well-constructed enterprise that has exhibited initially promising outcomes and that has the potential to enhance learning opportunities for those students that have too often been left behind. If successful, the iZone can serve as evidence that a combination of thoughtful design, organizational learning, and long-term commitment can position districts as leaders in the larger effort to enhance rigor and equity in US education.

# INTRODUCTION

In 2016, three of the authors of this report were nearing completion of a four-year study into the Tennessee Achievement School District (ASD). Our research into the ASD had examined both the political and educational dynamics of the state's takeover of a handful of underperforming schools, and the experiences of charter management organizations charged with engineering their turnaround. Our study showed that ASD operators struggled to meet the lofty goals for student outcomes that the state had established, and the ASD itself faced withering criticism from local community members angry about the loss of local control.

Although our research was focused primarily on the ASD, we could not help but notice the success of another improvement initiative in Memphis that seemed rooted in different principles and that fared far better on external evaluations. Just for our own information, we arranged for an interview with the then-leader of the iZone, Dr. Michelle Johnson. One can only learn so much from a single interview, but we were struck by her combination of experience, candor, and humility. We couldn't help but wonder if all the commotion caused by the ASD was masking an equally important initiative for improving schools that were no less challenging and no less in need of a radical intervention than those taken over by the ASD. Indeed, the iZone and the ASD were both drawing from the same state-designated list of "priority schools" (the lowest-performing 5% of schools), and while the ASD was technically a state-wide initiative, virtually all its schools were in Memphis. Some ASD and iZone schools were located only a few blocks from each other.

Several months later, over coffee, the Shelby County Chief of Innovation, Tanner Smith, expressed enthusiasm for conducting a multi-year research project into the iZone. Like Dr. Johnson, Smith was frank in his assessment of the iZone, noting that its overall success hid a troubling degree of variation among schools. He candidly stated that district officials had only a partial understanding of why some schools performed better than others, and that the iZone's future success depended on figuring this out. Some time after that, the Walton Family Foundation generously agreed to fund the research, and in December 2016 we launched the present study into the Shelby County iZone.

The research was designed to answer two overarching questions. The first concerned the strategy for improving teaching and learning in a local environment beset by intergenerational poverty, a student body with a host of academic, social, and emotional needs, and a district where generations of past reforms had experienced only intermittent success, at best. Simply, we wanted to know: What was the iZone model for improving its lowest performing schools, and what might account for its apparent success? Our second question concerned the process for constructing a new system from the raw material of the old one. Unlike the ASD, the iZone introduced no new organizations, no charter schools, and no governance changes. It operated under the authority of the district superintendent who was appointed by a locally elected school board—an utterly conventional governance arrangement. What was the strategy for overcoming the numerous obstacles that have historically inhibited change in large urban districts?

In this way, the iZone represents a combination of puzzles and possibilities. The puzzle is that for the iZone to achieve its goals, the same people operating in the same system in which failure had occurred would need to reinvent their professional identities, their skill set, and their productivity to a remarkable extent. This would be no small accomplishment, not only because of the formidable educational challenge the iZone presented, but also because many of these educators had been socialized into the old system over many years, and the system itself was immersed in the hierarchical and bureaucratic culture that defines many urban districts.

Solving this puzzle, however, would open up important possibilities. While takeovers and reconstitutions generate headlines, the path to large-scale improvement still goes through traditional districts that oversee the vast majority of schools (Larbi-Cherif, Lenhoff, & Glazer, 2020). If the

iZone could find a way to reinvent its system of service delivery and build the capacity to enact and maintain such a system, then perhaps other districts could do the same. For these reasons, this report is concerned principally with the strategic challenges of constructing an effective and coherent system within a traditional urban district. It considers how to ratchet up performance dramatically in an environment where academic failure has been far more common than success, and where the history of past reforms is a sobering reminder of the obstacles to be overcome.

Our results are not intended as a detailed recipe for improvement, in large part because no formula for success can simply be imposed on contexts where history, culture, and needs differ substantially. Rather, we depict the way in which the iZone evolved from a system rooted in school-level autonomy to one based on principles of interdependence and system-wide coherence. This report describes the experiences that informed that evolution and the foundational principles of the new system. Although many of the details we describe are particular to the iZone context, the core principles of multi-level design, interdependence, and continuous improvement have far-reaching applicability. The experience of the iZone speaks directly to how school systems can improve when anchoring their work to a common vision for teaching and learning and a shared theory of school improvement.

The report also depicts the dynamics of implementation that unfolded over the years of the study. This part of our analysis reveals the complex challenges encountered by a reform whose pedagogical principles and approach to school leadership represented a stark contrast to past practices and ideas. Our intent is not to cast implementation as a success or failure, but to illustrate the processes of professional learning, negotiation, and refinements to strategy that emerged over time. We unequivocally see the iZone as a remarkable and important undertaking that has charted an impressive path in reorganizing an entire system. We draw attention to setbacks and problems not to temper that enthusiasm, but because identifying and coping with these types of problems is central to operating a system of this nature.

## Methods

This research was designed to enable an in-depth look at school-level implementation coupled with an overarching view of general trends across the iZone. We combined a variety of qualitative methods, such as interviews, observations, and focus groups, with surveys that we administered across the iZone and among a handful of non-iZone priority schools. The interviews and observations took place with teachers and leaders from five case-study schools that we selected together with iZone leaders. The case study schools included elementary, middle, and high schools led by principals who varied in experience, style, and past performance. (See Appendix B for enrollment, achievement, demographic, and discipline data for the case study schools for the period covered by this report). Our team of seven researchers visited these schools two or three times a year, during which we interviewed math teachers, the school principal, math content leads, and other administrators. We also observed meetings of the Instructional Leadership Team (ILT) and Professional Learning Communities (PLC). The names of all individuals and schools mentioned in this report are pseudonyms (See Appendix A for further detail).

For several reasons we focused primarily on math instruction. First, limiting our analysis to a single subject area enabled an in-depth focus on the dynamics of instructional change. Second, when we began the study, the district had just instituted an ambitious math curriculum that was the cornerstone of its effort to enhance rigor and align instruction with the new state standards. While a comparable ELA curriculum would arrive the following year, at that time, the ELA program was in a state of flux. That said, the insights generated from our research shed light on the larger dilemmas and dynamics of system-level change, and not just math instruction.

We administered two different surveys over two years. One survey was constructed exclusively for school leaders and asked about a variety of topics specific to leading iZone schools. We asked, for example, about their attitudes toward the new curriculum, the focus of their leadership teams, how

closely they managed PLCs, and their opinion of the coaching and guidance they received from the iZone. The second survey was geared toward teachers. Here, we collaborated with colleagues from the University of Pittsburgh who had developed a survey instrument designed to characterize the nature of teachers' instructional practice. The survey includes a series of vignettes that depict the teaching of elementary-level mathematics. Teachers' responses to questions about these vignettes (e.g., whether they agree with the actions of the teachers in the vignettes, their responses to student questions) have been found to be a reliable predictor of their classroom practice. We provide more information on the teacher survey below. Finally, we conducted extensive interviews with iZone leaders about the strategy for improvement, how they saw themselves as supporting the change process, and the challenges they encountered in their work. These respondents included the (ever-changing) directors of the iZone, Instructional Leadership Directors (ILDs), and Content Managers (See Appendix C for further detail.)

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# HISTORY AND EARLY STRATEGY

Much of Tennessee's current education policy framework has its origins in the early years of the Obama administration, and particularly that administration's signature piece of education legislation, Race to the Top (RttT). This is true for the Shelby County iZone as well. State leaders had expressed growing concern about the state's education system, including its poor performance on 2007 NAEP tests and the Chamber of Commerce's "F" rating for the degree of rigor in Tennessee's assessments and standards.[3] Race to the Top promised a combination of legitimacy, political cover, and a large injection of funding to make significant changes.

These events led to the opening of a "policy window" (Kingdon, 1985) that culminated in the bipartisan passage by the Tennessee legislature of the First to the Top Act in January, 2010. The new law adopted the Common Core State Standards in math and English language arts (ELA), embraced value-added measures in teacher evaluation, and significantly increased the state's authority to intervene in local education matters. The law also changed Tennessee's approach to its lowest performing schools; until that time, local districts addressed school improvement without significant state intervention. First to the Top authorized the Tennessee Department of Education to formally identify the bottom 5% of schools based on student performance, to remove these "priority" schools from local control, and to assign them to the newly created Achievement School District (ASD).

The ASD was founded on principles of school-level autonomy, a minimal degree of state regulation and interference, and a competitive environment in which poorly performing operators would (supposedly) be shut down (Glazer, Massell, & Malone, 2015). Tennessee's selection as one of the two initial winners of the Race to the Top competition not only legitimized the approach but also provided a massive influx of funds. The ASD, however, could only be a partial solution to the problem of under-performing schools. Capacity was one reason. There were over 60 priority schools, far more than the fledgling ASD could handle. A second reason was financial. In addition to the RttT funds, the state was flush with

3 A National Center for Education Statistics report found that in 2007, Tennessee's standards for math and reading proficiency under the Tennessee Comprehensive Assessment Program were far below the "basic" level of proficiency set on NAEP. Further, Tennessee's proficiency standards were the lowest in the country in 8th grade reading, 4th grade math, and 8th grade math (State Collaborative on Reforming Education, 2015).

its share of the $3 billion in School Improvement Grants (SIG) that the Obama administration handed out as part of the 2009 American Recovery and Reinvestment Act. For newly appointed Commissioner of Education Butch Clayborn, the SIG money offered an opportunity to steer local districts away from what he saw as the ineffective strategies of the past. A third reason was political. The ASD represented an aggressive state role in a region whose political culture highly valued local control. As Clayborn later explained: "The idea of having district-controlled zones was always going to be more politically palatable than the state coming in and running schools itself."

In this context, the state officially launched two "iZones" in 2012.[4] They would be largely district-run, federally-funded initiatives that could alleviate the burden on the ASD of improving the State's priority schools. Moreover, by conditioning the grants on adherence to principles of increased autonomy, reduced regulation, and competition, the iZones gave Commissioner Clayborn a way to bring his philosophy to districts over which he otherwise had limited authority. The iZones also met a variety of needs at the local level, particularly in Memphis where the vast majority of priority schools were located. Local leaders had tried varying initiatives to improve outcomes in under-performing schools but had only weak results to show for it. Moreover, community activists complained that many residents had grown complacent and failed to pressure the district to find innovative solutions to urgent educational issues. The ASD quickly solved the problem of tepid public involvement as community members mounted an aggressive grassroots effort to prevent the state from transferring local schools to the ASD (Glazer & Egan, 2016).

District leaders expressed dismay over the loss of local schools to the ASD, but they also recognized the opportunity it presented to define their own reform initiative that would break from past reform efforts, avoid political backlash, and ratchet up the pressure on school leaders and teachers to improve performance. The selection of a well-regarded local educator, Dr. Michelle Johnson, as the director further cemented the iZone's legitimacy and public support. Dr. Johnson understood the unique political and educational opportunity in front of her and the role of the ASD in motivating change.

> *The ASD has caused us to really look at ways to support schools…It is actually going to make us take a critical look at what we possibly thought we were doing right…It is the only way we are going to get better….So, yes, it's pressure. Thank you ASD for it.*

Then-superintendent Derek Walker echoed this point:

> *The concern of your school being taken over is a big motivator. I think it has really made people more aware of accountability and forced them to step their game up. I think that without the ASD there wouldn't be an iZone…There is a real sense of urgency right now.*

While an injection of money, the commitment of local leaders, and the political capital afforded by the ASD were all crucial, they did not inevitably lead to improvements in teaching and learning. That would depend on the strategy devised by Dr. Johnson and her colleagues and on the ability of school-level professionals to enact it. As the statistics below show, the challenge these schools posed was daunting.

- In 2012-2013, in the first cohort of iZone schools, 16.2% of students scored proficient or advanced in ELA and 30.7% scored proficient or advanced in math. The six schools who would join the iZone in the following school year averaged 14.7% proficient or advanced in ELA and 18.5% proficient or advanced in math in 2012-2013.

4 In addition to the one in Shelby County, an iZone was established in Metro-Nashville in 2012. Subsequent iZones were established in Hamilton County in 2013 and Knox County in 2015.

- In the first seven iZone schools, an average of 97% of students received free and reduced lunch, and over 80% of these students were considered economically disadvantaged by the state based on receipt of food stamps and public assistance.

- From 2015-2017, about one in four students in iZone high schools did not graduate.

iZone leaders crafted a plan that was consistent with Commissioner Clayborn's philosophy, feasible for the relatively small number of initial iZone schools, and designed to quickly show impact on a state assessment that was not yet aligned with the Common Core State Standards. The strategy entailed a high degree of school-level autonomy, financial inducements to attract the district's most talented principals and teachers, and an extra hour to the school day. Schools would receive additional support services and guidance from the iZone's small but carefully selected central office.

A formal agreement between the district and the local union authorized principals in the iZone to dismiss teachers (regardless of union protections) and replace them with other teachers from inside or outside the district. Moreover, principals could deviate from the district's recommended curriculum and introduce their own materials, pedagogical philosophies, and other strategies they thought most likely to realize gains in student outcomes. These features departed from the district's standard operating procedures and established the iZone as a unique sub-system within the larger district that enjoyed its own identity, resources, and latitude.

The strategy was rewarded by three years of strong results on the state assessment, solidifying the iZone's reputation as a formidable improvement enterprise.[5] The iZone's success was further highlighted when Vanderbilt researchers reported that in its first three years, the iZone significantly outperformed the ASD in math and science, much to the delight of district leaders and the local community. The report's authors summarized their findings as follows: "iZone schools are having positive, statistically significant, and substantively meaningful effects on student achievement across all subjects … In the case of Memphis, the effects are large in math and science" (Zimmer, Henry, Kho, & Viano, 2015).

The success of the iZone in these early years, its local popularity, and its ability to outperform the ASD provided the iZone with legitimacy, political capital, and good will. State leaders and educational officials from outside Tennessee travelled to Memphis to learn how the iZone had succeeded where so many past initiatives had failed. Said one state leader, "We had the former Assistant Secretary of Education come to Shelby County and visit some iZone schools. She left saying, 'That is the best I have seen in my career.'"

## A SHIFTING ENVIRONMENT AND GROWING SCALE PRESENT CHALLENGES

By the 2016-2017 school year, iZone leaders had arrived at the conclusion that the strategy lacked long-term viability and that its run of strong results was unlikely to continue. Two factors contributed to their sobering analysis. One was the growing scale of the iZone. The initial seven schools that drove much of the iZone's early success had, by 2017-2018, ballooned to 23 schools. Moreover, this now included 7 high schools that posed a far more daunting challenge due to their size, structure, and depth of achievement gaps (Larbi-Cherif et al., 2019).

5 Averaging across all years and cohorts, iZone reforms produced positive effects on student achievement gains, concentrated in first two cohorts. Effect estimates for the iZone reforms in later years are positive but not statistically significant. (Pham, Henry, Kho, & Zimmer, 2020)

The increase in the size of the iZone strained the capacity of iZone leaders to identify and recruit principals with the experience and wherewithal to lead a school-wide transformation process. Even if they could have found 23 highly capable principals, those principals would have struggled to recruit over 600 equally capable teachers. Moreover, the recent secession of suburban districts from the Shelby County School District, coupled with over a dozen ASD providers, put additional strain on the local teacher labor market (Frankenberg, et al., 2017). Dr. Johnson increasingly understood that a strategy which relied on recruiting the best principals was poorly suited for the growing scale of the iZone, and that she had done little to prepare for the iZone's expansion:

> *The pool was shallow because I had not developed people. I was taking great principals from schools that they had turned around, putting them at these struggling critical schools, but I've run out of these great principals, and I am now in a dilemma where I don't have the human capital on the ground. I don't have a bench.*

Scale was not the only impediment. The state's long-awaited transition to the Common Core significantly increased the intellectual rigor of the state's performance expectations and assessment.[6] The consequences were particularly profound for priority schools, which already faced difficult circumstances and now had to meet a considerably higher bar. For the leaders of the iZone, this meant that even those principals and teachers once considered effective could no longer rely on their tried-and-true focus on basic skills and intensive test preparation techniques. Dr. Johnson captured the situation as follows:

> *I have to keep reminding people not to rest on their laurels, because we're not where we're supposed to be. Growth is great…Okay, so you're on top of the bottom…We are nowhere near where we need to be. And the new test is going to be a rude awakening.*

Another iZone leader gave an even blunter appraisal of the shift to more rigorous standards:

> *Principals continued to push SPIs [State Performance Indicators] like we've always done, which are extremely low-level. It was teaching to the test and just skill driven….It had nothing to do with teaching, more to do with games. But we're at the point now where games are over. It's now about how you instruct.*

The combination of increased scale and more rigorous standards rendered the original iZone strategy ill-suited to its new circumstances. Leaders worried that there were not enough principals or teachers to take on the extreme challenge these schools presented, and that even those who might have once been up to the task had little experience in building the level of instructional capacity demanded by the new standards. An original leader of the iZone noted that the increase in scale and new standards turned building-level autonomy into a liability.[7] "If you give an inexperienced race car driver the fastest car…it's not going to end well," he said.

6 Tennessee's transition to Common Core-aligned standards and a Common Core-aligned state test has been mired in policy shifts and controversy. Tennessee adopted CCSS in 2010, but it transitioned to its own similar standards, Tennessee Academic Standards, in 2017. It took until the 2015-2016 school year to adopt an end of year test, TNReady, aligned to Common Core standards. TNReady faced technological problems further delaying its use. For a full explanation, see: https://chalkbeat.org/posts/tn/2016/04/15/at-long-last-phase-out-of-common-core-is-official-in-tennessee/ https://chalkbeat.org/posts/tn/2016/04/28/turns-out-tennessee-wasnt-ready-for-tnready-after-all/].

7 The average tenure as an iZone principal declined (6.35 years to 5.32 years) from 2017-18 to 2018-19. In both years, about 40% of principals had less than three years experience in the role.

# A STRATEGY FOR MEETING THE LEARNING NEEDS OF STUDENTS, THE RIGOR OF NEW STANDARDS, AND STRINGENT ACCOUNTABILITY

Four years after the launch of the iZone, leaders faced a daunting three-part challenge. They needed to design a strategy that could cope with the extraordinary academic and social needs of a student population mired in decades of intergenerational poverty and neglect; that could meet the rigor of Tennessee's Common Core aligned standards; and that could produce results demanded by a stringent accountability system to protect their schools from ASD takeover. Moreover, they had to accomplish this with 23 schools, including a mix of elementary, middle, and high schools across ELA, math, and science.

The foundation of the new iZone strategy replaced building- and teacher-level autonomy with an interdependent system grounded in a shared theory of teaching and learning. The first step was to establish a consistent vision of what grade-level, core instruction for all students (Tier 1 instruction) should look like and a vision of how to get there. This design eventually came to include three nested layers: the "instructional" strategy, the "school capacity" strategy, and the "support" strategy.

## The instructional strategy

iZone leadership, now under the direction of Dr. Marcus Jackson, established an instructional philosophy that reflected the intellectual rigor of Tennessee's standards and assessments and was rooted in three central tenets: (1) conceptually focused, ambitious math content; (2) a pedagogical approach rooted in rich student discourse and "opportunity to struggle" as a way to engage students in active problem solving, and (3) an equity orientation that expected all students to reach grade-level standards.

While laudable, this ambitious and equity-driven approach represented an enormous shift and risk for teachers, who would need new skills and knowledge to prepare students to meet the new standards. Students were expected to exhibit a deep conceptual understanding of math content and justify their solutions to complex math tasks by using mathematical representations in addition to calculations. Further, students were expected to engage in mathematically-rich discourse in which they challenged each other to defend and refine their solutions. Additionally, the iZone's commitment to equity, reinforced by requirements of the federal Every Student Succeeds Act, meant that all students, rather than just a handful of advanced ones, were expected to perform challenging, conceptually-oriented math.

The new vision demanded a shift in how teachers planned and taught math, how they facilitated student discussion about mathematical concepts, and how they managed unexpected turns in student work. For example, rather than have students primarily memorize formulas and practice times tables, teachers were now expected to build students' understanding of the theoretical concepts demonstrated in topics such as place value, multiplication, and fractions (we provide an example in a later section). Dr. Jackson, who in many ways was the architect of the strategy, captured the challenge this posed to teachers:

> *Teachers truly didn't understand the conceptual background for why we do math a certain way. It's really difficult for you to teach something that you don't know, and so we get stuck in the procedural aspects of how to teach math. That's been the hardest struggle for us…now what we are asking them to do is unlearn what they learned.*

## The school capacity strategy

This vision for mathematics instruction would be little more than aspirational without an equally robust plan for building professional and organizational capacity at the school level. Therefore, another key part of the iZone's strategy was to redesign school leadership and in-school professional learning to support the implementation of the shared instructional vision. This theory of school improvement was a dramatic departure from past norms and practices characteristic of urban school systems, including Shelby County (Honig, Copland, Rainey, Lorton, & Newton, 2010; Supovitz, Mayer, & Kahle, 2000).

The cornerstone of the improvement strategy was a common curriculum. Eureka Math, initially piloted in the 2016-17 school year, became the district's official K-9 curriculum in advance of the 2017-18 school year.[8] The importance of the curriculum was twofold. First, Eureka embodied the iZone's vision for math instruction through its focus on conceptual understanding, productive struggle, and student discourse. Second, the fact that Eureka would be shared among all K-9 teachers was critical to the iZone's effort to build an interdependent system in which teachers, leaders, and iZone officials worked collaboratively toward a common mission. The common curriculum and lesson plans enabled the district support staff to align professional development, collaborative exchanges, new tools, and information systems to those specific problems of practice. The generic, stand alone, disconnected workshops and lectures that historically characterize teacher professional development could, at least in theory, be replaced with a program of professional learning tied to the specifics of the curriculum.

One key support involved the development (or acquisition) of an aligned set of tools to support practice. The Eureka curriculum already included several tools: a 60-minute lesson structure, scripts for how to present content and reply to likely student responses, problems for teachers and students to work on, examples of student solutions and depictions of mathematical concepts, notes on how to scaffold the lesson for struggling learners or English language learners, guiding questions for debriefing with students, and sample worksheets for students to practice what they learned. iZone leaders supplemented these with a bevy of additional tools that offered more comprehensive support for classroom instruction. These were complemented with a heavy investment in instructional coaching that provided teachers with individual guidance in navigating the new curriculum and pedagogy.

However, as we discuss below, iZone leaders eventually concluded that district coaches could not shoulder the entire capacity-building agenda. There were simply not enough resources or staff to support continuous, one-on-one learning among dozens of leaders and hundreds of teachers. Thus, while coaching was one part of the strategy, equally important was the development of school-level systems that embedded professional learning in the day-to-day work of teachers and school administrators. The iZone's school-level blueprint — i.e., the structures, roles, routines by which schools would operate — would be distributed among the members of a newly-formed instructional leadership team, charged with actively supporting teaching and learning throughout the school.

The Instructional Leadership Team (ILT) was charged with assessing instruction, defining interim goals, and measuring progress. Central to this was the Cycle of Professional Learning in which ILT members observed multiple classrooms to identify instructional trends and challenges, used data to design professional development, math PLCs, and provide feedback to teachers.

To ease the burden on principals, iZone leaders tasked the math department head and the math administrative lead (as well as that of other departments) to take on new leadership roles in their schools aimed squarely at supporting instructional improvement. This included facilitating PLCs, serving on the ILT, organizing instructionally focused departmental meetings, observing teachers,

8 The iZone had encouraged the use of Common Core-aligned pedagogical tools, such as the Eight Mathematical Teaching Practices, but had not required the universal use of a single curriculum until the adoption of Eureka. At the time of our study, Shelby County Schools required Eureka for grades K-9. Teachers in grades 10-12 were expected to use curricular materials aligned to the shared pedagogical vision but had more autonomy in selecting those materials.

and giving feedback.[9] The iZone also instituted rehearsal routines in which teachers practiced lessons in front of other teachers and administrators and received feedback before teaching the actual lesson. Complementing these roles were a set of tools and routines to guide leadership practice and collegial interaction. Examples include the Instructional Protocol Guide, a common rubric for observing and analyzing instruction within and across schools; the aforementioned Cycle of Professional Learning; the 60-day plan that guided the ILT in establishing an interim set of improvement goals; and data analysis programs that analyzed assessment results.

This somewhat dizzying array of tools embedded ideas about leadership and collaborative culture in tangible (and replicable) artifacts and organizational routines, and they generated a shared set of experiences for school leaders. That said, these processes would do little to improve instruction unless these processes were implemented in ways that actually improved teaching and learning. To complicate the challenge, many of these changes cut across the grain of entrenched practices and norms. Principals, who historically enjoyed a high degree of building-level authority were now asked to share that leadership among a team and to subscribe to the iZone's theories of improvement. Norms of privacy among teachers were challenged by regular classroom observations and by PLCs in which they were expected to talk candidly about failures and setbacks. Content leads were expected to deviate from norms of non-interference by pointing out their colleagues' practices that were inconsistent with the iZone philosophy. How could iZone schools implement an organizational blueprint that departed so significantly from past norms and practices and strained schools' expertise?

## The support strategy

The answer to this question lay in the iZone's effort to organize a robust system of guidance that would support school and classroom-level implementation. Two support groups, the Instructional Support Team[10] (IST) and the Instructional Leadership Development Team (ILDT) were charged with supporting teachers and school leaders in learning the new curriculum, understanding the standards, and implementing the iZone vision.

**The IST.** The IST was divided into subject-specific teams (e.g., math, ELA) that provided one-on-one coaching to teachers. As an overall unit, the IST consisted of the iZone's foremost instructional experts who were most familiar with the new curriculum, pedagogical approach, and underlying ideas. Several of the IST leaders had participated in state-wide coaching workshops run by the University of Pittsburgh, and they shared an unwavering commitment to and understanding of the iZone's core instructional ideas. The iZone presented an opportunity for them to solidify their role as instructional experts within the district. Patricia Jones, an IST leader, described the shift from providing general support wherever needed to focusing intently on building professional capacity:

> *Before, we had coaches who were sitting down with principals to do their master schedules, and sitting in on interviews and telling who to hire and not to hire. Those things are not unimportant but they took away from what our purpose is. Our purpose, again and again, is to build instructional capacity of teachers and school leaders so the instruction improves. If it doesn't fall into that bucket, it's not important.*

**The ILDT.** The role of the ILDT was to help principals transform their practice in line with the iZone's vision of instructionally focused, distributed leadership. Instructional Leadership Directors (ILDs) designed programs of support for iZone principals that included one-on-one coaching, shadowing, and joint classroom walkthroughs. The initial cohort of ILDs was chosen from among the district's

9 The math administrative lead often served as the PLC coach.

10 The IST included a director, five "content managers," and 30 "advisors" (i.e., coaches). Each content manager supervised a team of five to six advisors who worked directly with teachers in a specific content area. There was a separate content manager and team of coaches for math, ELA, science, social studies, and high school. The ILDT included three elementary school ILDs, 1 middle school ILD, and two high school ILDs. They reported directly to the director of the iZone.

most respected and successful school principals whose experience was thought to have prepared them for this mentoring role. Finally, the iZone created district forums for collaborative learning about the pedagogical vision, the curriculum, and the tools and processes that supported teaching, learning, and leadership. For instance, the iZone had monthly content collaboratives where teachers from different schools convened to collaborate on common instructional problems that the new curriculum surfaced. Similarly, the ILDs led "Zone meetings" with multiple school leaders to help align the theory of improvement across schools and coordinate processes and routines.

In sum, iZone leaders put in place structures and routines to support new instructional and leadership practices, and they reorganized district support functions to build school-level expertise. But as noted above, structures, routines, and roles do not by themselves create the knowledge, skills, and beliefs needed to turn an ambitious vision of teaching and learning into reality. That could occur only if many iZone professionals at different levels used these resources to enact a system of professional education that would transform teaching, learning, and leadership in 23 iZone schools. Building and leveraging a system of this nature would force the iZone to confront a high degree of complexity and uncertainty, and to engage in work that few US districts have undertaken.

## A SYSTEM OF PROFESSIONAL LEARNING

The ambitious nature of the iZone vision challenged deeply ingrained professional beliefs about teaching, learning, and leadership. It also conflicted with prior instructional reform initiatives, old state assessments that promoted strategies at odds with the pedagogical foundation of Eureka and entrenched norms of autonomy and privacy. Further, iZone teachers and school leaders needed to enact this new vision while simultaneously managing the demands of a student body with deep academic and social needs, the pressure of accountability, and the rigor of the state's new standards.

### Building a system of professional learning

A central task confronting iZone leaders was to establish its own curriculum for professional learning. In the early years, a select group of ILDs and advisors supported school leaders and teachers primarily based on their individual experiences and ideas about school improvement. During this first phase, we observed ILDs participating in departmental PLC meetings, modeling how to provide feedback to teachers, helping lead ILT meetings, and guiding leaders in observing, documenting, and analyzing instructional problems. Similarly, we observed advisors and content managers helping teachers learn the curriculum, plan lessons, review student work, and enact practices aligned with the pedagogical vision.

These were talented individuals, for sure, but their ability to support professional learning was rooted largely in their own personal experience and tacit knowledge. In contrast to how the iZone organized the work of teachers and leaders, the advisors and ILDs had few shared tools and common routines. As the iZone increasingly leaned on schools to build teacher capacity, questions arose about how to best support new school-level structures, roles, and routines. Each ILD had their individual answers to these questions, but the iZone, as a system, had done little to codify a trajectory of school improvement or a complementary curriculum for leadership development that could be used consistently.

The fact that knowledge and expertise was embedded in individuals rather than in established processes or materials left the ILD team vulnerable to turnover (by contrast, new iZone teachers had a curriculum, lesson plans, and other materials they could lean on). New ILDs could rely on their past experiences, but there were few common tools or protocols to guide their work, and few collaborative structures that enabled them to regularly share their challenges and solve problems. For the most part, ILDs confronted challenging problems of practice on their own. Not surprisingly, some reported an

acute sense of isolation. ILD Geena Baines described the situation:

> *We really have not had an opportunity to shadow each other as much. I think I shadowed [another ILD] in the very beginning, but I have not had training in coaching....We have not had mentors. I can't even say that I've been coached, really.*

Similar questions confronted the Instructional Support Team. While the original cohort of advisors and content managers brought with them a wealth of instructional knowledge and expertise, the expansion of the IST raised concerns about the consistency of advisors' skills and questions about how to best enhance teacher learning and practice. For example, questions arose about the efficacy of joint lesson planning with teachers, and whether more time should be devoted to modeling new practices, observing teachers, and providing feedback. Advisors expressed uncertainty about which issues to highlight when they provide feedback after observing a lesson, and more generally, the trajectory of teacher learning.

As with the ILDs, the absence of a well-defined system forced advisors to make many critical decisions based largely on their own judgment and discretion. This may have been a viable strategy in the early years when the IST was comprised of a few highly skilled individuals, but by 2017, when the team exceeded 30, it was a recipe for inconsistency. Natasha Payne, a content manager who supervised a team of advisors, noted the lack of a shared system: "If we want to duplicate what we do, if we want to talk about the effectiveness of what we do, can it all just be a 'this is how I feel today', or can we standardize it?" The point was echoed by principal Damien Carter:

> *Coaching teachers is not something everybody knows how to do. That's a learned skill. You have to have somebody come in and actually teach the teachers how to do that, and there's not a model [in the iZone]. There's a certain way you give feedback. The coaching model period has not been established.*

## Toward a codified system of professional learning

Between 2017 and 2019, both the IST and ILDT set out to turn an approach to professional learning that depended largely on the personal discretion into systems that were based on a shared curriculum and pedagogy for teacher and leader learning. As we elaborate below, they made important progress in this endeavor but as of this writing, more work remained.

Beginning in 2018, iZone leaders codified what they referred to as the five pillars of an iZone school. Drawing on ideas and materials from an assortment of organizations—e.g., New Leaders for New Schools, Relay, and Leverage Leadership—Dr. Jackson and other iZone leaders developed an iZone "playbook" that elaborated key pillars of school organization which they considered essential to improving student performance. Jackson explained the basic structure of the leadership playbook:

> *The first month [focuses on school] culture and climate, but culture and climate is continuous, so you don't just put it away. Then the focus switches to teaching and learning in September, which is set it up by those actions we already took around the culture and climate...And while we're engaged in the teaching and learning, we're also making sure our system is tight, and our staff is aligned. It's all a part of a yearlong process and set of procedures.*

The playbook represented a key step toward codifying the essential characteristics of an iZone school.

It sketched a trajectory for schools to follow as they integrated new practices, structures, and routines. For example, schools that were at an early stage of development or were new to the iZone placed their initial emphasis on establishing a professional and productive school culture, which was then followed by a focus on instruction. Moreover, the playbook identified key leadership practices for school leaders to learn and master, and in doing so, established expectations for school leadership.

The playbook also laid a foundation for the iZone's leadership curriculum. Whereas ILDs had previously determined each school's improvement trajectory on an individual basis, the five pillars established a nascent theory of school improvement that moved through identifiable stages. ILDs still operated at a high level of individual discretion, but their primary responsibility was now to support principals in identifying and adopting best practices represented by each pillar. Dr. Jackson explained:

> *Each of the leaders [is] at a different place. So, we can provide the blueprint for what the leadership model should be, and once the ILD completes a diagnostic of a leader, he builds the individualized support plan. So, the playbook is exemplary for the leaders, but each leader gets an individualized plan of support based on what the data shows that leader needs.*

The Instructional Support Team (IST) also sought to build a system of professional learning that was less rooted in the talents of a handful of individuals, and more based on a shared set of tools and routines. The Eureka Math curriculum, coupled with the iZone's pedagogical approach, established the "content" of the professional learning curriculum that teachers would need to learn and the IST would need to deliver. What remained to be determined, however, was the pedagogy for teacher learning and the trajectory by which teachers developed their expertise.

With experience, the IST gained clarity on some of these issues. Leaders recognized that joint lesson planning was not sufficient to help teachers develop new classroom skills and that they needed additional ways to strengthen teachers' knowledge of the pedagogical reasoning underlying the curriculum. IST leaders also developed a better understanding of the professional knowledge that the curriculum required of teachers, which enabled them to assess teachers' needs more precisely. Like ILDs, the advisors began to develop a shared language for explicitly communicating expectations to teachers.

We see the evolution of the IST and the ILDT as critical to the overarching iZone strategy, and part of what makes the iZone an important example of system building within a complex and challenging environment. As noted earlier, few districts have tried to build entire systems of professional learning at the scale of the iZone. At the same time, as of this writing, both groups had made meaningful but incomplete progress toward developing clear trajectories of professional learning to guide their work. Structures like the Instructional Leadership Team and professional learning communities were, in the words of ILD Daniel Barnes, "still pretty infantile." Similarly, the IST is yet to fully codify a professional learning curriculum designed to systematically move teachers toward effectively implementing the Eureka Math curriculum. While there were numerous examples of teachers who effectively implement Eureka Math, there remained considerable disparities in professional knowledge among teachers and leaders that seem likely to lead to inconsistent results.

Indeed, inconsistency is one of the central themes of our analysis. This inconsistency stems partly from the incomplete nature of the professional learning systems, which are still in the early stages, and the clash between the iZone's ambitious vision of teaching and learning, the deeply entrenched norms and beliefs of many iZone practitioners, and the mixed signals from the larger environment. As we explain in the next section, this clash between old and new shaped the way that teachers and leaders interpreted the curriculum, the extent to which they saw the iZone vision as meeting the needs of their students, and the degree to which they saw the iZone approach as aligned with the demands of the state assessment.

# IMPLEMENTATION

The overarching goal of the iZone was to reorganize schools into "tightly coupled organizations" in which administration, leadership, and collegial work were tied to its ambitious vision of teaching and learning. In this section, we discuss the way in which iZone teachers and leaders interpreted and used the new resources, processes, ideas described in the previous section and the variation in practice that emerged. Our analysis of implementation will show that the iZone vision emerged alongside an older and more deeply entrenched set of ideas and ways of doing business. In some cases this mixture of old and new were further cemented by local and state policies, incentives, and guidance.

Our data speak to main four main points. First, the state accountability system is subject to varying interpretations. While some iZone leaders saw it as the impetus for ambitious change, others—particularly those for whom poor performance had the most severe consequences—saw it as a reason to be cautious about calls for new instructional and leadership practices. Second, the ambitious math instruction that iZone leaders promote clashes with what many teachers perceive as their tried-and-true practices and what they have learned about the needs of struggling learners. This does not mean that teachers outright rejected the new curriculum or pedagogy, but that they frequently subverted or repurposed it in various ways.

Third, as designs for new forms of leadership and school organization are implemented, leaders interpret these designs, the environment, and their own role in different ways. Some saw the iZone guidance and resources as a welcome opportunity to empower a cadre of teachers and administrators to push their schools toward a more ambitious and conceptually-oriented form of math instruction. Others found reasons to keep the iZone at arm's length or to implement it selectively. Our analysis also draws attention to the more difficult challenges of coherent organizational and instructional change in high schools compared to elementary schools.

Fourth, the larger educational environment in the US is an important character in this part of the iZone story. The attitudes of teachers and leaders toward new ways of working were not simply matters of personal preference or beliefs, but a reflection of larger social and political forces. These forces include local, state, and federal policy but they also go beyond that. Past education reforms have left a legacy of ideas, materials, and beliefs that, even if no longer official policy, continue to shape the attitudes and practices of iZone practitioners and that further complicate the work of building a coherent system rooted in contemporary ideas about math instruction. Our discussion, thus, does not cast judgement on the actions of teachers and leaders, regardless of their approach to the iZone design. Ultimately, the larger lessons are not about the behavior of individuals, but about the incremental process of creating coherent, interdependent instructional systems in an environment that has long encouraged a different set of ideas and practices.

## Implementation of the school-level design

The iZone's school-level design sought to remake the organizational and professional life of schools. In this vision, administration and management would focus primarily on enhancing instructional capacity, carefully monitoring results, designating specific areas for improvement, and facilitating collegial interaction. Reflected in this approach was a commitment to a distributed leadership model that sees robust school leadership as requiring a larger cadre of staff whose combined professional knowledge can compensate for gaps in any one individual's understanding, and can help schools withstand the inevitability of leader and teacher turnover (Spillane, 2006).

To briefly foreshadow, our case study schools and survey evidence suggest that school leaders and teachers put in place and generally found value in collegial work, distributed leadership processes, and more active engagement with teaching and learning. While enacting these new roles and routines

did not occur without confusion or struggle, we saw numerous signs that these initiatives were helping schools become more coherent, goal-oriented organizations in which the work of teaching and learning was "deprivatized"[11] and purposefully managed. At the same time, school leaders took up these practices in ways that reflected their judgment about their own and their staffs' instructional expertise, the needs of students mired in poverty, and the type of instruction likely to achieve adequate assessment results. To a degree, these adjustments and the variations that ensue are inevitable and essential. But in other cases, they subverted long-term goals and undermine the coherence of the larger iZone enterprise.

Many of the staff we interviewed expressed appreciation for aspects of the new leadership approach and the joint work emerging from the school-level teams. Administrators and department heads regularly observed classrooms which made them more aware of building-level practices. This effort often surfaced common problems of practice, fostered shared goals, and built a more integrated and consistent program of professional learning. Nikkia Grant, principal of Woodson Elementary, described how the routines of the ILT brought more coherence to their work:

> *It helped us, first of all, to identify what our goal is and then, what are some things we are going to do as a team. And with our PLCs, to make sure that by the end of this cycle our teachers are further along, and that we are seeing an impact on student performance.*

She described how the school's ILT honed in on teachers' ability to question students in ways that would elicit explanation and improve understanding. New questioning techniques informed the school's professional development strategy, their math PLC agenda, and the feedback that content leaders gave teachers during classroom observations and reviews of lesson plans. An ILT team at a different school, Baldwin Elementary, realized through their observations and walk-throughs that teachers used different vocabulary to refer to the same ideas, which confused students. The team developed a plan to address this.

Instructional rehearsals, variously called Practice Perfect or Teach Me, represented another organizational routine that generated information about teachers' thinking and practice. During these weekly sessions, one or two math teachers presented portions of Eureka lessons to their colleagues and leaders who played the role of struggling students. These rehearsals reversed the traditional norms of privacy that have long characterized the teaching profession. They also stimulated a more granular discussion of teaching practice and created the potential for rich discussions about how to teach Eureka. They also provided a rare opportunity to expose the gaps that existed in the math content knowledge of both new and experienced educators. Tonya Neville, a math content lead at one elementary school, explained what the rehearsals revealed:

> *What we're realizing is that teachers are not presenting the conceptual part [of the lesson]. We're now seeing the misconceptions that the presenting teacher has, but also those of the other teachers because they're not always able to see the presenting teacher's errors…The teachers are making the moves and getting lots of feedback. At times, it is very uncomfortable.*

Survey results suggest that these experiences reflect broader organizational trends toward greater system-wide coherence, instructional focus, and professional learning opportunities. For example, approximately three-quarters of iZone math teachers agreed or strongly agreed that the new instructional work fit together within and across grades and steered them in a common direction. Over 80% perceived that the math practices and programs promoted by their school leaders were consistent with those of the iZone. This is no small feat considering how eclectic and diverse curricular materials

11 The term "deprivitize" means to make the work of teaching more transparent and less the domain of individual teachers working in isolation.

and math practices were in the iZone just a short time before.

At the same time, case study and survey results also reveal the ways in which school leaders strayed from—and at times subtly undermined—the core purposes behind the distributed instructional leadership design. In some cases, strong principals declined to relinquish control to the leadership team, preferring to keep a tight grip on the decision-making process. In other cases, particularly at the high school level where more specialized content, department structure, and other organizational features present formidable challenges, principals either stuck with the time-honored tradition of delegating instructional decision making to individual teachers or relied on external support organizations, who were eager to step in but used teaching approaches that were not always aligned with those promoted by the iZone. In yet another scenario, high school leaders embraced collaborative structures but did not use them to advance the iZone's core instructional ideas.

Principal Geoffrey Woods of Longview Elementary School took charge of nearly every aspect of instruction and professional development, effectively making decisions and directing actions of the ILT rather than bringing issues to the teams for deliberation or choice. This principal was perceived to have a high level of expertise in mathematics specifically and instruction more broadly and was accustomed to directing instructional work and developing teachers' practice. Despite designating content leads, maintaining PLC coaches and setting up the ILT as required, Woods single-handedly ran the math PLC, directed the actions of the ILT, and helped teachers plan the minutiae of lessons. His expertise legitimized his high level of involvement and was well-received by teachers. Ms. Chambers, a math teacher in his school, made this observation:

> *He's very much an instructional leader. He just loves to model exactly what he wants to see. I've worked in a school where a principal was able to articulate her expectations, but she was not able to model them. And so, if you can't show me how it looks, I don't know if you really know.*

However, this singular, take-charge leadership style in effect assigned a low priority to the iZone's goal of developing and expanding schoolwide instructional leadership. Woods found these and other external directives either a distraction from or disruption of the business at hand:

> *This is my work. I own my work. I'm not looking for a person to come in and tell me that you need to do this, this, and this…I'm the type of principal where, if you let me do my job, my teachers are going to get all of the support that they need, plus more support if you allow me to do my job. It's just really allowing me to do my job.*

This leader presents an interesting and complex case for the iZone. On the one hand, it would be foolish to argue that Woods was not an effective principal, and he was demonstrating a level of instructional leadership rarely found in US schools. Moreover, his school's impressive performance on the state assessment enhanced the iZone's legitimacy as a turnaround district, as well as the standing of the school and its teachers.[12] Yet this heroic form of leadership reneges on the iZone's commitment to distributed leadership and reportedly limits the capacity of this school's teams to jointly solve problems and provide instructional support to their colleagues. It was not clear whether the school could maintain its upward trajectory were he to leave.

At the other end of the spectrum was Woodson Elementary, whose principal cultivated every dimension of the iZone's distributed leadership model and worked diligently to develop her teams' capacity to take on instructional responsibilities. Principal Grant did not have a high level of subject matter expertise

12 From 2016-2017 to 2018-2019, Longview nearly doubled student achievement in reading and increased achievement in math by 40%. Over the same period, Woodson increased achievement in math from 8.3% on track to 35.5% on track, quadrupling the number of students on track in math.

in math and understood that she could not, by herself, lead the necessary instructional changes. She embraced the new content lead roles and the ILT as a way to collectively develop the internal capacity of the school. At the same time, she sought multiple opportunities to build her own knowledge of Eureka, so she could effectively engage with the teams and participate in collaborative decision-making. In this case, we see a leader who has less content and pedagogical expertise and is less able to single-handedly guide instruction, yet is more committed to shared leadership and collective decision-making. In fact, this school made gains in mathematics achievement that were as impressive as Longview's.

While other principals acknowledged that they lacked a strong level of mathematics expertise, they did not seek to acquire that knowledge to facilitate instructional change. Instead, these leaders either trusted the individual capabilities of their teachers or relied on external partners to provide them with content-based professional development. This was particularly the case for high school principals, who believed that their chief responsibility for supporting instruction was not to direct and intervene on the details of classroom practice, but to manage non-instructional issues and buffer teachers from outside interference. This latter approach is reflected in the words of one high school principal, Mr. Davis of Eastside High:

> *Teacher support is a top priority for me. It could be as simple as pushing a work order through to get light bulbs changed or the air conditioner fixed. That impacts the environment and teachers' ability to teach. It could be me purchasing resources, making sure that the school budget… provides teachers with everything they need. My job is to remove as many barriers that prevent teachers from teaching. I want each individual teacher…to just feel like they have some ownership of their room, some ownership of their teaching methods.*

Principal Davis's focus on resourcing and buffering his teachers was not illogical. He reasoned that his lack of experience in math instruction did not provide him with the legitimacy to forcefully guide a change process among teachers. Several of his teachers were graduates of the Memphis Teacher Residency (MTR), a local, faith-based organization that provides an alternative route to a teaching credential. MTR provides regular support for their novice math teachers through weekly coaching and guidance, and Davis felt ill-equipped to insert himself into the mix. He also perceived that many of his teachers, struggling and overwhelmed, had little bandwidth for the kind of collective learning and instructional leadership iZone leaders expected. Eastside school leaders resisted even holding the ILT and PLC meetings. "I think we had three math PLC meetings this second semester," said one administrator.

> *This year I just did not push it. I received feedback from my teachers that they're really stressed and burned out. So I tried to pull back some.*

Principals engaged in different types of buffering even when their schools did embrace aspects of the iZone leadership design. This was the case at Carver High. In contrast to Eastside, staff here immediately took up the ILT model as a way to give teachers more direct control over instructional work. Teachers were enthusiastic about the opportunity to participate in shared decision-making. One teacher described the benefits:

> *We talk through problems, and this year our team is better at talking through issues and sharing our voices as a collective team. There are some really smart people on this team who have good ideas and good solutions.*

However, iZone leaders expressed concerns about the ILT's instructional focus and priorities. For instance, Carver leaders proclaimed trust in the expertise of their teachers and were willing to follow teachers' lead in ignoring pedagogies at the heart of the iZone's approach, as one school leader explained:

> *I get pushback from the iZone advisors coming in. They say, "Why isn't the teacher doing this?" or "Eureka says your teacher should be here." But if [the student] isn't proficient, what sense is it following the curriculum when [the student] lacks the skills that to do the work? So I push back on that…I'm betting on my teachers. I've bet on them in the past and it worked for me."*

The lack of school-based leadership with the expertise, legitimacy, and incentives to promote new ideas turned teams like the ILT and PLC into mechanisms that reinforced conventional practices and assumptions about learning. The end result, according to one iZone leader, was that teachers in both Carver and Eastside remained largely independent actors who frequently rebuffed the new curricula and pedagogy, and retained a largely skill-based and test-prep-oriented approach in their classrooms:

> *The big priority right now for math is for the questions and tasks to align with the standards and getting them back in the curriculum. That's where we're struggling in both schools…The [teachers] have been given the autonomy to do as they want, and so it's very low level. It's just skill based. Skill, skill, skill— that's just very low level.*

High schools are not immune to organizational change or instructional improvement, but our analysis reinforces the well-documented finding that a combination of organizational structure, specialized content, norms of autonomy, and large achievement gaps among students makes meaningful reform at the high school level a particularly complex endeavor. Neither high school principal in our sample pressed math teachers to make the difficult instructional changes that iZone leaders sought. They either doubted their own legitimacy to lead, saw little reason to question their teachers' tried-and-true techniques, or relied on outside sources of expertise that teachers reported were satisfactory. That said, these school leaders also saw growth on the state assessment and used it to justify their approach. Echoing the sentiments of many, one ILD noted that a singular focus on test score growth could increase growth while displacing the long-term goal of rigorous learning and proficiency:

> *They want this magic bullet to get growth on the test…[B]ut what we're not getting is proficiency, and students deserve to be exposed to grade level work. Are we going to teach this test or do what's right for children? Sometimes I wonder what [these principals] will do or not do for the sake of getting the numbers to grow.*

These leaders could easily be portrayed as stuck in the past, opposed to change, or unconcerned about the well-being of their students. What we saw, however, was not recalcitrant individuals, but an educational environment in which the iZone is but one source of guidance among many. In fact, old ideas and practices remain alive and well, and high-stakes testing provides strong incentives for leaders to approach iZone-like reforms with caution. Principals who have been successful in meeting growth targets and have been rewarded for those accomplishments have little reason to abandon old leadership methods in favor of new and uncertain ones. At the high school level, where achievement gaps are often large and course content more specialized, the incentives to abandon traditional methods in favor of new and risky practices are even weaker and the challenge of instructional leadership is particularly steep.

This does not mean that school leaders' ideas and priorities cannot move over time, or that they

cannot learn new ways of thinking about instruction. Principal Grier of Baldwin Elementary had a high level of expertise in mathematics and teaching pedagogies. But he wrestled with Eureka's press to maintain grade-level instruction for students who were achieving far below grade level, rather than leveling instruction to meet students where they were. With repeated exposure to Eureka professional development and the decision to take some risk to move forward with new practices, he saw results that surprised him. Grier began to recognize that his initial insistence on simplifying Eureka deprived students of rich opportunities to learn and excel, as he later reflected:

> *Hell, I've been killing my kids. …- I'm thinking I'm helping [my kids] by dropping [the curriculum] down a level or taking components out. I'm thinking I'm helping them, but actually, I'm harming them. The child is going to live up to the expectations that you put in place for them…And [students who we didn't think would be able to get it] actually did.*

Summarizing our findings about implementation of the iZone model of school-level instructional leadership is difficult. On the one hand, we did not find evidence of a one-to-one correlation between high quality implementation of the school-level design and strong student outcomes. All five case study schools made progress in tested performance, whether or not they put each element in place, and whether or not the instructional leader had a high level of expertise and openness. Even the two high schools that tenaciously held to traditional methods made enough achievement growth to eventually exit the iZone.

One might therefore conclude that school leaders should be free to enact their own model as long as they obtain expected results. Indeed, many reformers would advocate for this approach, including some educators within the iZone. Recall, however, the problem that iZone leaders encountered when the number of iZone schools increased from 7 to 23, and when the state replaced low-level standards with ones aligned with the Common Core: There simply were not enough leaders with the level or type of knowledge and skills necessary to meet these extraordinary challenges. In this way, the iZone school-level design was more than just a strategy or model. Rather, it was an effort to establish a body of professional knowledge that defined what it meant to be an iZone principal. This design could be used to socialize and provide successive levels of support to new and experienced leaders and it could be collectively improved by leaders and teachers working within the parameters of the design.

Professional practice, in other words, is not only about obtaining strong results at the school level and in the short term, but about commitment to a shared set of ideas and practices that will benefit the larger enterprise. That larger enterprise entails a commitment to student learning not just each year but into the future, and making sure that students leave elementary school with the conceptual knowledge and competencies that provide a foundation for ambitious learning in middle and high school.

## Implementation of the Instructional Design

The school-level design was intended to nurture and develop professional learning for a different and more ambitious vision of instruction. Though laudable, this vision strained teachers' existing knowledge, skill, and ideas at least as much as the organizational design did for school leaders. In their own schooling or training, math teachers are rarely exposed to instructional practices that focus as much on math concepts as procedural fluency, or with the notion that students who are years behind should be taught at grade level and be encouraged to struggle with and discuss math problems (Cohen and Ball, 1990; Boaler & Humphreys, 2005; Fullan 1991; Lampert, 2001). The new vision embodied in the Eureka Math curriculum required teachers to take a major leap into the unknown in a context where failure had extreme repercussions.

It would not have been surprising, therefore, if educators had expressed outright resistance to Eureka

Math and its vision of teaching and learning. The reality turned out to be more complex. A combination of interview and survey evidence show that schools made remarkable progress in using the new math curriculum and pedagogical approach, but that at the same time old practices and more conventional beliefs about how students learn and how best to teach often remained in place. Below we illustrate the dynamics of a change process that involved displacing deeply entrenched norms and habits, within local and state environments that offered a complex and contradictory brew of incentives and resources.

A large majority (86%) of iZone math teachers did in fact use Eureka as their primary curriculum, and over three-quarters used it on a daily basis in their classrooms.[13] More importantly, over half indicated that Eureka was consistent with their personal beliefs about effective instruction, and 71% found it to be an effective resource for teaching mathematical concepts—an aspect of math instruction that is unfamiliar to many teachers and frequently overlooked. Many teachers we interviewed expressed appreciation for Eureka's approach to conceptual development and the deeper understanding and learning it can yield. Destiny Heard was one example.

> *When I was in school…the teacher never taught me why are we doing this. But [with Eureka] you can see the 'why.' In the place value chart, you can understand why we're unbundling one ten and creating ten more. You can just understand the why, not just the how. So I do appreciate Eureka for…the conceptual development.*

Statements like this corresponded with some encouraging patterns of classroom instruction. Our survey instrument was designed to capture practices associated with more or less attention to mathematical concepts, as well as with instruction that allows students the opportunity to productively struggle with and explore mathematical ideas.[14] Results showed that in 2018-19, 57% of iZone math teachers focused on practices that fostered students' conceptual understanding. By comparison, only 50% of math teachers sampled in Tennessee the year before reported similar practices. This difference between iZone teachers and the state sample is particularly meaningful in light of the far more challenging demographics and accountability pressures confronting iZone leaders and teachers.

13 Since Eureka had not yet been adopted for all high school math courses, usage was, as expected, lower there.

14 Teachers' commitment to providing explicit attention to mathematical concepts and providing students opportunity to struggle with important mathematical ideas was classified as high or low based on teachers' answers to a wide range of survey questions about the frequency of use and importance of teaching practices, and a series of vignettes of teaching practice (Stein and Correnti, et al. 2018)

We also identified teachers and leaders who reported that experience with Eureka was changing their beliefs about effective practice, as illustrated by this comment by teacher Marcia Dixon:

> *Eureka is a program where…even though all the kids may not get it, you keep going. I've noticed some of my kids, they may not get it in this lesson, but then the next lesson they may be saying, 'Ah, now I understand,' because each lesson builds on the next.*

Similarly, Mr. Grier, the aforementioned principal who once pressed for instruction leveled down to the performance of students, now asked his teachers to maintain grade-level instruction and be faithful to the conceptual component of each lesson. He explained his current approach:

> *Teachers might be modifying something that doesn't need to be modified, that actually is important, and if you skip it…you start having huge gaps in the learning. You have to be careful with [modifying the curriculum], because you might take away the key pieces of that concept development, and concept development is very important. That's where the actual learning takes place.*

These survey and interview data suggest that significant changes are underway. At the same time, a substantial body of our survey and interview data reveal that this transition is incremental and that many teachers and leaders also maintained instructional practices that reflected different and potentially competing notions of teaching and learning. One way to explain these seemingly contradictory outcomes is that while the majority of iZone teachers have embraced the ideas of conceptually focused mathematics and productive struggle, many are uncomfortable and uncertain about whether or how to move away from more conventional modes of direct instruction with students who are far behind. They are similarly unsure how these strategies will enable them and their students to meet high-stakes accountability targets. In the face of uncertainty, school leaders and teachers often turned to more familiar instructional practices.

**Adaptations to address struggling learners.** The most fundamental dilemma for teachers was how to put these new practices in place when the majority of their students were far behind. Developing students' conceptual understanding of math entails a variety of student-centered learning tasks, such as providing dedicated opportunities for students to struggle through problems on their own, explore multiple representations of mathematical concepts, and verbalize their understanding and confusion. Procedural algorithms and fluency are not ignored, but in Eureka, students learn procedures within the context of mathematical concepts. A brief example from a Eureka third-grade lesson illustrates the point.

**Figure 1: Task 1, Grade 3 (Module 1, Lesson 7)**

Angel writes $2 \times 8 = 8 \times 2$ in his notebook. Do you agree or disagree? Draw arrays to help explain your thinking.

Traditionally, students have been asked to follow procedures that show that the calculations 2 x 8 and 8 x 2 are the same. However, this task presses students to realize that two quantities that seem unrelated can be the same value—in this example, that two groups of 8 and eight groups of 2 are equal. At first, some students might think that these are two different values because they are represented differently with hands-on items and look different when written. However, teachers can ask students to draw arrays to compare the two different expressions. Students could then use different ways to demonstrate that the two arrays are equal; they could rotate one of array by 90 degrees to demonstrate congruence, or use arithmetic through counting by ones, counting by groups, or multiplying. What makes this task different from traditional math tasks is that students are encouraged to make connections between different mathematical representations to demonstrate the "commutative property" of multiplication.

For numerous iZone teachers, however, these notions seemed counterintuitive. Educators have long been taught that students need a firm foundation in mathematical procedures before moving on to more abstract concepts, and that good teachers adjust the level of materials to meet students "where they are." Eureka's emphasis on grade-level instruction ran counter to teachers' skills and pre-existing beliefs. Indeed, the approach can seem paradoxical: how can one teach 9th grade algebra to students who have 4th grade skills, and how can teachers help these students keep up with a fast-paced curriculum without overwhelming them and leaving them farther behind?

It is not surprising, then, that only 38% of teachers who responded to our survey agreed that Eureka was an appropriate curriculum for the majority of their students, and that one-fourth or less agreed that it helped them reach students far below grade level (25%) or moved at a good pace for their students (23%). Ms. Heard, a 5th grade teacher at Woodson put her concerns this way:

> *The first day of rounding was rounding with the number line. In order to round with the number line, they have to have basic number sense. We've gotten through the lesson and when we give that exit ticket, the majority of the students still have not mastered the lesson because it's on grade level. It's for students who are ready for that lesson… There's a lot of prerequisite skills so that now we have to go backwards. Eureka is steadily going forward.*

Teachers were rarely convinced that their most struggling learners would make necessary progress under the Eureka approach, as illustrated by this comment from teacher Aaliyah Morris from Longview:

> *I think that a lot of times the way the curriculum is written, they want [students] to be conceptual first and then go to the procedural. But when you're working with children that are fragile learners, it doesn't always happen that way. Now, if it happens, we're happy, but most of the time it does not work that way…Once they get the procedural part of it, they get confident and then they can make the connections to the conceptual.*

In sum, teachers' and leaders' reservations about the Eureka Math curriculum did not stem from a lack of appreciation for the conceptual foundations of mathematics or from a reflective resistance to district policies. Rather, for many, experience told them that the content, pace, and underlying pedagogical principles were simply incommensurate with the needs of their students.

**Adaptations to the state assessment.** Meeting the demands of testing and accountability requirements was another challenge. Leading math educators in the iZone argued that strong use of the Eureka curriculum and its conceptually rich pedagogy would enable students to perform well on the test. They urged teachers and leaders to resist the allure of test-prep-driven instruction, as indicated by this

comment from iZone leader Desiree Jackson:

> *You could blitz[15] all day long, but there's no way in the world you're going to put every type of question and every possible way that question could be placed in front of kids. However, if I teach you a deep understanding of it, I don't care which format or which question type you see on the test, you're going to persevere. We have to switch that mindset.*

But a majority of teachers and school leaders were skeptical of these claims and wary of taking such risks. They perceived Eureka as misaligned with the format and content of the state test, and they were dubious that fidelity to the curriculum would translate into achievement gains. Two common assertions among teachers and leaders were that Eureka lacked items presented in a format akin to what students would experience on the state assessment and that it did not provide sufficient exposure to tested content. One teacher, Ms. Harvey, expressed an opinion shared by many:

> *A child may be able to do the work conceptually, but when they are tested a different way and the questions come up a different way, it's not that they can't do it, it's just a lack of exposure.*

Similarly, teachers and leaders argued that the pace and sequence of Eureka curriculum units did not give students timely or adequate experience with the content they would encounter on the test, as indicated by this comment from one school leader:

> *[The pacing was] too quick or not soon enough, coming too late, not giving students enough time to actually practice and really learn exactly what they needed to learn before we moved to something else.*

Survey data suggest that these perspectives were shared by the majority of iZone teachers and leaders. For instance, only 29% of math teachers agreed that Eureka prepares their students for the types of problems they will see on the TNReady assessment. The responses among leaders were similar. Well under half of leaders (39%) agreed that their school's math curriculum was "well suited to the needs of their students," and 54% concurred that their school's math curriculum was "a better fit for schools without so many disadvantaged students." As many as 89% of school leaders agreed that the Eureka Math curriculum "needs to be supplemented with other materials for their students to succeed on the state assessment."

These types of doubts led educators to employ practices that departed, at least in some ways, from the intended pedagogy and representation of content endorsed by Eureka and iZone leaders. One common adaptation, for example, was the introduction of what some call a gradual release style of teaching, exemplified by the I Do, We Do, You Do technique. In this method, teachers first present and model a mathematical solution, ask the class to replicate it, and then instruct students to do a similar problem independently. While school leaders often encouraged this approach, several iZone leaders argued that this method shuts down students' opportunity to grapple with a problem and in doing so, hinders their ability to come to a deeper, conceptual understanding. But one teacher explained what to her was the unassailable logic of gradual release and of aggressively monitoring student learning:

> *So every 10 minutes I'm checking for understanding, modeling from the teacher first. That's one thing that we're big on. I know the rules is that we'll just kind of let them grapple with*

15 "Blitz" refers to instruction characterized by a singular focus on test preparation.

> *it. But why do that when you know the environment that you're in and children are already struggling?*

Caught between the tension of teaching Eureka as it was written and teaching Eureka at the level of their students, iZone teachers often simplified math tasks to reduce students' uncertainty. For example, one high school math teacher, Martin Burch, described how he lowered the demand of an Algebra 1 problem on linear equations that, as written, called for students to also find solutions that included negative numbers and non-integers (i.e., fractions). By instead asking students only to find positive integer solutions, Mr. Burch avoided pressing students to develop both a robust computational fluency and a conceptual understanding of what constitutes a line by testing solutions that might be unfamiliar. Mr. Burch understood the potential of the curriculum for rich conceptual learning, but he was at a loss on how to make it work for his students:

> *The first option [leaving the task as written] would lead to probably 75 or 80 percent of the class instantly raising their hand and wanting me to come help them. And then for the other 20 percent, they'll try for 30 seconds then raise their hand, "Is this right?"' So you're in there – you know, 20 kids plus raise their hand immediately, a few are working on it and they're going to raise their hand pretty shortly thereafter; how do you handle that?*

While teachers often reduced the complexity of math tasks, school leaders frequently altered the pacing, sequence, and content of the curriculum to better align it, in their view, with the state assessment. For example, some elementary leaders adjusted pacing guides, designed new assessments closely aligned to the state tests, and decreased the time spent on the concept development portion of lessons. One principal explained the rationale:

> *The curriculum does not align to what students are going to see at the end of the year. It's not aligned to the expectations that teachers are being held to, what's in the best interest of your teachers, what's in the best interest of your students. I think the obligation rests on you as a principal to know what's in the best interest of your school.*

In several instances, teachers and leaders seemed to treat Eureka-based instruction and preparation for district or state assessments as unrelated activities. For example, a 9th grade algebra teacher reported that she focused on conceptual learning at the beginning of the quarter but as the district benchmark assessment neared, she reverted to procedural drills. In one remarkable case, a principal organized the school schedule to include blocks of time for Eureka and separate blocks for other material he thought better suited to the state assessment. In another school, a teacher explained how during the last few months of the year, curriculum and pedagogy were repurposed in advance of the state assessment:

> *When we make it to January, I've covered everything that a third grader's supposed to know. The test is not until April, so I have January, February, March to go back to those things that they didn't do well on…Then it's almost like you're in a blitz mode because TNReady is coming.*

One adaptation employed by many leaders and teachers was to lean heavily on supplemental materials that they thought better fit the learning style of their students and better prepared them for the state assessment. The most common of these was the Ready curriculum, which had been approved by the iZone on the condition that it did not displace Eureka as the primary curriculum. Ready is aligned to state standards but provides students with discrete strategies that focus less on the conceptual

foundations of math; it is also more pedagogically directive. "Ready kind of breaks down the standard just a little bit more for students," said one teacher. "It's more on the level that they need; it presents more strategies and is more concrete." While Eureka remained the official Tier 1 curriculum, several schools significantly expanded the time students had with the Ready material, and district staff reported that some schools were relying on it almost exclusively.[16]

Teachers' preference for Ready is reflected in survey data. In the 2018-2019 teacher survey, 78% of iZone math teachers agreed that Ready was more appropriate for the majority of their students, which was double the 38% of teachers who agreed with a similar statement about Eureka. Similarly, 89% of iZone teachers agreed that Ready was better for students who are far behind, compared with just 25% for Eureka. And 85% of teachers surveyed agreed that Ready maintained student engagement, compared with 44% who felt similarly about Eureka. Moreover, 80% of teachers perceived Ready to be aligned to TNReady, and 78% said it prepared students for the types of problems on the state assessment. The comparable responses for Eureka were only 29% on both alignment with the state assessment, and types of problems.

These adaptations to the curriculum might be seen as modest tweaks made by teachers and leaders who are best positioned to understand the needs of students and who bear the consequences of assessment results. But several iZone leaders saw these changes as compromising the integrity of the iZone's instructional approach. They clashed with teachers and principals over whether these were necessary strategies or an unproductive departure. iZone official Claretta Michaels argued that teachers or leaders who altered the curriculum sequence undermined the scaffolding for student learning carefully planned by curriculum designers:

> *They don't understand the curriculum. It's just that simple. The curriculum spirals, it builds upon each unit, and then spirals back through. If you alter it, you are not letting it do what it is supposed to do...If the kids are learning, it doesn't matter if they learn it a week before the test or two months before the test.*

Another iZone leader argued that adding additional items that mimicked the test format was part of a deeply entrenched pattern of test prep that ultimately did little to support meaningful student learning. She and others were troubled by schools that set aside planned lessons to drill students on tested content in the weeks and even months leading up to the state test. "We have to switch that mindset... Test prep [and different item formats] can't take the place of good instruction," she said. Other iZone leaders expressed concern that reliance on Ready subtly undermined the shift in instructional practices they were seeking to cultivate. Desiree Jackson, one of the leading iZone experts in math instruction, advised against Ready because it provided teachers with little insight into student thinking and misconceptions:

> *The majority of Ready problems...are multiple choice and...strictly procedural, and you really can't gauge what a student knows. I may know if you've got this right or you got this wrong, but what does that tell me about your knowledge as it relates to the standard?*

16 High school teachers did not have the Ready curriculum, but the underlying dynamic remained the same. The 9th grade teachers we spoke with frequently relied on old textbooks and curricular resources that did not press them to make the kind of changes to their instruction that Eureka did.

Similarly, Jasmine Stevenson, an ILD, argued that while Ready's procedural focus may be successful at the elementary level, achievement rates would drop dramatically as students move into middle school:

> *[The procedural focus of Ready] may work in elementary while you're still learning the foundational skills because those pieces are less conceptual than they are when they get to middle school…So you can get by, and it'll look like you're successful because you are learning tricks. But by the time when you get to middle school, nine times out of ten that trick won't work, and then you see this big dip from elementary.*

Finally, several leaders worried that an overreliance on Ready could lead teachers and principals to conclude that students are unable to handle the rigor of Eureka's instructional model and that improved test performance would discourage these educators from attending to other important indicators of student learning. Marcus Jackson, a top iZone leader, put it this way:

> *Ready can make you live in a test prep world because it can set your mind all about the numbers of where my kids are in regard to the test. So, if you're a person that lives to perform well on a test, then you'll default to Ready.*

He and other leaders were emphatic that even the most challenged students would succeed if teachers gained a deeper understanding of Eureka and persisted in its use.

The question of whether Ready undermines Eureka is important for the iZone to address, but ultimately the issue at hand is not about one curriculum versus another. The question is whether more conventional resources, which are meant to support teachers' work with struggling learners, inadvertently create places to hide for those who are opposed to or skeptical of the new pedagogies? Do these tools allow schools to justify minimizing more ambitious content and pedagogy, and thereby threaten the coherence of the instructional vision at the heart of the iZone? And perhaps most importantly, do they provide a subtle path for teachers to reduce expectations for struggling learners and, in doing so, avoid the uncomfortable work of raising their expectations for students from disadvantaged backgrounds and developing the ability to teach them grade-level, intellectually

## Discussion

If this were a typical implementation study, we would close this section by declaring the extent to which the iZone design for curriculum and instruction was implemented with fidelity, and if it were an impact study, we would report on student learning outcomes. This study has a different purpose. We sought to illuminate how efforts to promote a coherent, rigorous, and equitable system of instruction must battle a complex and often incoherent environment that shapes the interpretation and enactment of new ideas, materials, structures, and roles. This interaction between old and new produced variable results.

The teacher survey results stand out as particularly salient. Despite steep challenges, iZone teachers demonstrated a greater likelihood of teaching conceptually oriented mathematics than teachers from across the state who completed the same survey in the previous year. That iZone teachers work with students from enormously disadvantaged backgrounds who are often years behind makes this a remarkable testament to the resolve of iZone leaders, principals, and teachers. As we have detailed, however, implementation was still marked by notable inconsistencies and modifications. Informing these modifications were differing views of how at-risk children learn and what it means for a curriculum to be aligned with a state assessment. Certainly, significant variation in teachers' mathematical knowledge and instructional expertise also played a role.

We also saw considerable variation in how school leaders reacted to a call for new leadership practices, collegial structures, and more aggressive management of instruction. In one notable case, school leadership wholeheartedly embraced the new vision, and in another school, leaders moved decidedly in that direction. Yet in three other schools, leaders reacted with a greater level of apprehension; they saw little reason to forego approaches they felt were working well for them and their teachers. In some cases, "working well" meant extraordinarily hands-on instructional leadership, whereas in others it meant minimal interference in teachers' professional work. Across these three schools, the iZone model for instruction and leadership was slow to take root. These patterns of interpretation and implementation suggest a fitful transition in which new ideas and practices vie for influence with previous beliefs and practices that have dominated in US schools for many decades.

rigorous content?

# CONTINUOUS LEARNING AND IMPROVEMENT

The challenges and dilemmas described above reflect the enormity of the iZone project, the dramatic shifts envisioned in professional norms and practices, and the fact that success hinged on interdependent changes at every level of the system. In this sense, the iZone can be seen as a series of bold experiments about locally controlled school turnaround (in contrast to the state-run ASD), about an ambitious, shared pedagogical vision, and about a multi-level, interdependent system of instructional support. These experiments were informed by research and past experience, but they still entailed a high degree of uncertainty and risk.

Moreover, while the larger iZone environment provided resources and incentives, a great deal of the work was left to iZone leaders to determine on their own, which is also a sort of experiment. The question, then, was not whether iZone leaders would need to make adaptations to the original vision, but whether there were mechanisms in place to understand the required changes and the flexibility to make them. In this section, we examine the evolution of the iZone strategy in order to illuminate the systems that allowed it to continually improve on the original concept. We pay particular attention to how divergent theories of instruction and improvement emerged in the iZone, threatening to undermine its coherence and core strategy, and the dilemmas this posed for system leaders.

## Evolution of the Design for Instruction

As described above, while many iZone leaders believed that sticking closely to Eureka would establish a strong foundation for conceptually focused teaching, other theories emerged from schools that bred skepticism of this strategy. It is not difficult to understand why teachers and leaders would want to make adaptations that rely on familiar practices, and why they might view the ideas of iZone leaders as naive and risky. In a low-pressure environment that provided ample time for experimentation, teachers and school leaders could work more gradually to devise solutions to these formidable challenges. But the state's accountability framework demanded immediate improvements in assessment outcomes, with little opportunity for learning and the inevitable missteps that come with that. In other words, the policy environment incentivized a puzzling combination of deep changes to instruction coupled with quick fixes aimed at short-term mastery. For iZone leaders, this led to an acute dilemma: how to encourage long-term improvements in teaching and learning while simultaneously demonstrating short-term gains in tested achievement.

Moreover, the size and scope of the iZone—23 of the lowest-performing schools in the state spread across a district of close to 800 square miles—meant that it was impractical for iZone leaders to monitor or enforce a set of best practices across hundreds of classrooms. The iZone would operate as a coherent system only if teachers and principals internalized the iZone's ideas, even if effective implementation emerged slowly. Thus, while iZone leaders could have insisted on strict fidelity to Eureka, doing so risked alienating precisely those individuals on whom success depended. At the same time, to acquiesce completely to the concerns of many iZone teachers and school leaders invited a retreat to past practices.

Over time, iZone leaders took steps to cultivate a shared problem definition and a common approach to implementing the curriculum that acknowledged, and to an extent validated, the competing theories of teaching and learning. In 2018-19, iZone leadership accommodated schools' requests to supplement math instruction with other curricular materials, notably Ready, so long as schools used these resources as an intervention to support struggling learners outside of normal class time, and not as a replacement for Eureka. As noted above, many teachers were already using Eureka, but official iZone policy on Ready was ambiguous and contested. In officially allowing the use of Ready, leaders acknowledged teachers' and principals' concerns about relying exclusively on Eureka to meet the needs of struggling learners in a high-stakes environment. One iZone leader explained the reasoning: *"If you*

*use Ready, then just use it as an intervention tool because your core curriculum is still Eureka. The part that we had to be firm on is that Ready was only intervention and not core. Two totally different things."*

In addition, IST members began to work with teachers to use curricular materials in ways that more directly supported student test preparation. iZone leaders reasoned that if teachers were going to deviate from Eureka to prepare students for the tests, then the iZone should minimize the deviation from its core instructional ideas. For instance, the IST developed lessons that combined the principles of Eureka with question types that teachers felt were necessary to prepare students for TNReady. As one IST team member reflected:

> *Our philosophy is not so much test prep as good teaching, but we know that people are going to test prep…So, all we're doing is taking the Eureka assessment item and showing them how to transform it to a different question type. It's a compromise. By no means do we feel like that's what we would tell you at the top of the year, but at this point, and especially when we come back after spring break, it's all about test prep and trying to become that level four and level five school. There is a monetary value attached to that.*

We draw attention to these adaptations not to judge their educational significance, but to illuminate how negotiation and compromise are critical for maintaining coherent systems in the face of entrenched ideas and incentives that send mixed messages about the wisdom of adopting new practices. In this sense, the official recognition of a supplementary curriculum that is more familiar and perceived as more aligned to the state assessment constitutes an acknowledgment that new reforms pose a risk to teachers and leaders in a high accountability environment.

The negotiation also implicitly recognized that systemwide reform requires a type of collective action, which requires a shared problem definition that brings together groups with diverse interests. It also recognizes that in many urban communities, the education system is a critical source of family income, benefits, and middle-class status (Henig, Hula, Orr, & Pedescleaux, 2001) and that teacher burnout, fatigue, and turnover are threats to student learning. The key challenge for iZone leaders, then, was to maintain the basic integrity of the instructional approach without alienating teachers and leaders whose support was critical to the iZone's success.[17]

## Evolution of Instructional Support

Another persistent question confronting iZone leaders was how to organize a coherent and multi-faceted system of support designed to cultivate the knowledge, expertise, and will of iZone teachers and school leaders. As discussed earlier, the Instructional Leadership Team (ILT) and the Instructional Leadership Development Team (ILDT) were the cornerstone of this part of the strategy. These teams represented the iZone's in-house expertise on instruction, leadership, and professional learning, and their performance and coordination were critical to the iZone's success. The work of both groups was complicated by high rates of teacher turnover, a district culture steeped in hierarchical management, the looming threat of the ASD, and a relative scarcity of materials and resources.

Coordination proved a particularly thorny problem. Shortly after the expansion of the iZone, in 2017-18, it became increasingly evident that the two groups operated according to divergent theories of school improvement, and this was leading to differing priorities and conflicting guidance to schools. The ILDs supported a school-level model of action in which the principal is the instructional leader chiefly responsible for guiding teaching and learning, improving teacher performance, and establishing the new internal processes designed to generate ongoing cycles of improvement. The ILDs' primary job was to develop principals' expertise so that they could set priorities and fulfill these new expectations.

17 Though we did not collect data on issues like burnout and fatigue, during our three years of studying the iZone and seven years of conducting research in Memphis, we became acutely aware of the emotional and physical toll that the work took on teachers and school leaders.

ILDs worked with principals to identify schoolwide instructional priorities as determined by building walkthroughs, classroom observations, and analyses of student data. Critically, ILDs were also responsible for working with principals to meet external accountabilities which included, for example, helping them use data to identify students closest to meeting the schools' measurable objectives and determining standards where performance was lacking.

The IST instructional coaching team had a different focus that centered around improving the instructional practices of individual teachers. They worked primarily and directly with teachers to design lesson plans and address instructional challenges. They created cycles of professional development that guided teachers on an individual, long-term learning trajectory that transpired over months. They adhered to a theory of improvement that saw the personal growth and development of teachers as a necessary foundation for strong schoolwide practice. By virtue of these beliefs and responsibilities, they paid less attention to schoolwide trends, did not parse school or grade-level data, and offered few schoolwide remedies. In other words, they diagnosed the needs of individual teachers and provided individualized treatments, absent deliberate attention to the school context.

Although both the ILD and the IST were committed to a common vision of teaching and learning, they operated with different sets of responsibilities and ultimately different lenses on how to best build schools' capacity to improve. These different theories of action, coupled with a lack of regular communication between the two teams, led to conflicting guidance to teachers. IST advisors experienced disruptions in their cycles of support for teachers, as principals and ILDs redirected teachers to focus on different practices or cancelled coaching sessions in favor of schoolwide professional development. IST members perceived that their advice was disregarded, and that teachers were getting inappropriate guidance from less expert leaders, as indicated by a comment from one advisor:

> *The process always starts the same. We're going to do a walk-through, identify trends, but then, if that principal chooses not to adhere to the recommendations, then that's where the disconnect will lie. My efforts will then become futile because they're the leader of that building.*

Another advisor made the point even more bluntly: "[Teachers] don't work for me, they work for their building level leader." Principals and ILDs, on the other hand, thought IST advisors had little grasp of the big picture in the building and viewed advisors as diverting teachers' attention away from their efforts to address more common, school-wide problems. One ILD commented,

> *I'm in schools more than the advisors are…I need [advisors] to do what I say because I see things that need immediate attention, but they want to focus on their own plan.*

Why would two groups operating in the same space, using many of the same tools, and committed to the same overarching goals develop divergent theories of improvement? One reason regards their differing levels of exposure to the state accountability framework. The IST's location in the system sheltered them to a large degree from the intense accountability pressures experienced by principals and their supervising ILDs. This allowed the IST to maintain a steadier eye on developing individual teachers' knowledge and skills, and to a degree, buffer teachers from external accountability demands. Their implicit theory of action was that instructional growth and student achievement do not necessarily proceed in lockstep, and that teacher learning progressed incrementally over time. ILDs, on the other hand, had no such luxury as their reputation, as well as that of their principals, depended heavily on assessment outcomes.

In an effort to resolve these tensions and mixed messages, in 2018-19 the iZone placed instructional advisors directly under the supervision of ILDs. The content managers who had previously overseen

advisors' work continued to provide them with professional learning and support but were no longer responsible for allocating their time across and within schools. In practice, advisors now focused more on establishing school-level routines by participating in PLCs, providing feedback to school and department leaders, and ensuring that schools had the right expertise and processes to support teacher development. There was still some one-on-one support for teachers, but this was no longer the primary role of the IST or the iZone's primary improvement strategy.

These shifts in strategy brought multiple benefits. The first was a more coordinated system of guidance that minimized conflicting messages from differing sources of authority. This was critical, because a coordinated and integrated system of guidance was essential to changing teachers' thinking and practice. Second, the new structure clearly communicated that schools would be expected to shoulder much of the burden of teacher learning and that iZone support units would help schools make those changes. Third, the new system could support the addition of new schools without requiring a heavy financial investment in advisors.

But the new structure also brought risks. One was that different ILD teams, whose authority was now expanded, would gradually develop different ways of addressing instructional problems. For example, one ILD worked closely with the math content manager and allowed instructional advisors to work more intensively with individual math teachers at the beginning of the year. Another ILD made decisions with less direct involvement and input from the math team, and at least initially avoided the kind of intensive work between advisors and teachers that the former thought was essential for effective coaching. These differences may or may not prove consequential. In the absence of consistent communication and efforts to codify practice, however, ILD-led teams may eventually diverge to the point that they, too, operate according to separate theories of improvement. At least one iZone leader feared this was already occurring:

> *There's not nearly enough communication and collaboration among the leadership team, with the ILDs and the advisors, across content areas. We do have monthly meetings, where all of the advisors across grade levels come together, and all of the managers and the directors, but it's not for the purpose of truly identifying iZone gaps; it's more informational.*

In short, while the new arrangement solved problems of coordination between role groups, it risked exacerbating incoherence within them.

A second risk was that the strategy now relied on school leaders to perform work that many were ill-equipped to do. Instead of skilled coaches guiding teachers, the iZone would rely on department heads, content leads, and PLC coaches that had much more varied experience and expertise in supporting instructional improvement. Greater inconsistency in the quality of guidance seemed inevitable. Moreover, by placing advisors under the supervision of ILDs, the iZone risked giving priority to managing short-term instructional challenges over laying a foundation for long-term teacher learning. Certainly, some ILDs were knowledgeable about instruction, but as a whole the IST was the expert body charged with cultivating professional knowledge of instruction in the iZone, and now its authority was diminished.

## Discussion

One central point of these examples is that the model for improving teaching and learning exists in a continuous state of imperfection. Thus, an integral function of leadership in iZone-like systems is to continuously identify and address shortcomings in strategy, incoherence, and divergent theories of practice. A second point is that strategies for teaching, learning, and improvement are contexts for negotiation and compromise. The glossy appeal of terms like "effectiveness" and "best practices" belie multiple perspectives, variable interpretations, and uncertainty about how to cope with the extraordinary challenges that iZone-like environments present. In this sense, organizational learning is not exclusively a matter of determining "what works" but of crafting strategies that rest on a shared problem definition, that equitably distribute risk, and that engender broad-based support among teachers and leaders. The alternative is to cope with conflict in the way that US schools have traditionally done-- by permitting each school, teacher, and leader to act according to their own preference and personal experience.

Third, organizational improvement requires more than empathy and a compromising spirit. Compromise, negotiation, and learning demand an understanding of the underlying conflicts and divergent interpretations, which in turn requires the capacity to collect and analyze a wide range of information. The divergent beliefs about Eureka, about the trade-off between one-on-one coaching and school-level capacity building, and about the conflicting sources of guidance may appear straightforward. In practice, however, the ability to identify, understand, and interpret such issues requires a supporting infrastructure that few educational organizations, and large districts in particular, possess. The iZone cultivated an interdependent, multilevel, data-driven system that allowed its leaders to learn from variation, study changes, and make decisions for the long-term sustainability and improvement of the ongoing experiment.

Finally, establishing coherence in an iZone-like system is an ongoing process. Strategies for improvement are perpetually being tested, and competing theories of work are likely to emerge. This places a premium on organizational structures that facilitate dialogue within and across work groups. The problem solving highlighted here is a social and interactive process that requires deliberate efforts to share experience, interpret ambiguous and conflicting data, craft collective interpretations of the environment, and negotiate a common strategy to address complex problems. However, these types of communication structures and processes are antithetical to districts' infamously siloed structure and hierarchical culture. The sense of urgency that often characterizes aggressive turnaround initiatives is another obstacle. Although district and school leaders' desire to rapidly solve problems and quickly realize gains is admirable, it can foster an attitude that prioritizes action over talk. The talk that we refer to, however, is not idle chatter, but the mechanism for understanding and managing pressing problems of practice.

# CONCLUSION

As readers will recall, iZone leadership initially pursued a strategy that leveraged a handful of the district's best principals and teachers. The strategy was highly successful and paid dividends in the form of student learning gains, local legitimacy, and political capital. iZone leaders came to realize, however, that a strategy rooted in school-level autonomy meant that many school leaders and teachers would need to cope on their own with the challenges of rigorous standards and assessments, students with dire social and economic circumstances, and enormous pressure for improvement. A few extraordinarily talented leaders and teachers may have been able to manage this burden, but iZone leaders recognized that even well-qualified educators could not independently develop the necessary ambitious and novel practices.

Faced with these circumstances, iZone leaders pursued a strategy based on interdependence in which schools would share in the work of transformative change. With remarkable speed, the leadership established common goals, defined core principles of teaching and learning, assembled a talented and committed team, identified and addressed gaps in their strategy, and made strategic compromises to enhance commitment in a high-stakes environment. Not surprisingly, the iZone has encountered obstacles and some inconsistent performance. That is not an indication of poor strategy or weak commitment, but a reflection of the fact that large-scale, systemic improvement is a more complex undertaking than a strategy that produces high profile but small-scale change, and that does little to improve the capacity of the larger system. The iZone has encountered its share of struggle and inconsistency, for sure, but these are unavoidable for an enterprise of this nature.

The most important lessons from the iZone, thus, regard the dynamics of change and the process by which a large and complex system integrates a set of practices and ideas that stand in stark contrast from those that preceded it. The iZone may represent a type of educational system better aligned with contemporary expectations, but it is emerging alongside the old one. The most pressing questions facing iZone leaders were not simply "what should our classrooms look like" or "how should our schools be organized," but also how to cultivate shared practices, ideas, and commitments in a local environment characterized more by pluralism than coherence, and in a state environment that offered mixed incentives and inconsistent resources.

As illustrated throughout this report, conceptually oriented, pedagogically ambitious instruction poses a steep learning curve for teachers, leaders, and teacher educators. This expertise gap could not be solved entirely by curriculum or pre-designed lesson plans. Rather, it required an incremental process of professional learning in which teachers grappled with the underlying mathematical content while developing a tolerance for the uncertainty that inheres in more ambitious instruction. All this stood in contrast to most teachers' past instructional methods, and had to be learned through experience, coaching, and support. Principals, department heads, content leads, and coaches needed not only to increase their understanding of math instruction and pedagogy, but also to learn new ideas and approaches to professional learning.

One conclusion from our analysis, then, is that systemic change of this nature entails interdependent systems of teaching and learning for both students and school and district professionals. Each system requires a curriculum, pedagogy, assessments, and network of support. Each of these elements must be designed, managed, and steadily improved over time. A system of professional learning differs markedly from conventional notions of professional development because it entails not just instructional activities but a theory of teacher and leader learning; not just a handful of material resources but a sequenced curriculum; not just a team of professional developers but a clear pedagogical approach; and not just evaluation forms distributed at the end of a workshop but a system of continuous improvement. The iZone experience suggests that such a system can be built, but also that it is a long-term endeavor fraught with uncertainty and an inevitable degree of trial-and-error.

The importance of organizational redesign at both the school and district level is a second takeaway. The tools, structures, and routines that the iZone introduced into schools reflect an effort to reshape organizational life and professional culture. Similarly, the iZone's ILDT and the IST were not just important support functions, but a multi-faceted effort to ensure that consistent messaging prevailed over the usual cacophony of ideas and strategies, to codify a shared system of improvement, and to establish a culture that privileged expertise over hierarchy and compliance. Here, too, the contrast to traditional ways of working is stark.

Third, there is a political element to the change process, but not in the way normally associated with the word politics. After years of conducting research in Memphis, we assumed that politics would be central to any iZone narrative and that the divergent interest-group priorities would dominate headlines as they had with the ASD. This turned out not to be the case. The iZone is a locally led initiative that has more than held its own against Tennessee's controversial state-run district, and as such has enjoyed a broad base of local and state support. The rancorous community meetings, protests, and heated exchanges that demoralized ASD leaders have not been a feature of the iZone.

But this does not mean that politics plays no part in the iZone. The iZone strategy exposed divergent interests among groups and individuals with differing professional beliefs and interpretations of the environment. Teachers who have had some success using other curricular resources and pedagogical techniques may see little reason to shift to a new approach, and principals may be reluctant to risk their reputation with a leadership model that differs from what has worked for them in the past. Indeed, for those who teach in and lead schools, replacing tried-and-true practices with new and uncertain pedagogies and materials is replete with risk. There are powerful incentives for them to look askance at the type of changes iZone-like reforms call on them to make.

This conundrum is political insofar as it refers to the processes of negotiating divergent interests and beliefs to pursue collective goals. The political scientist Clarence Stone wrote that "good, bad, or mixed, politics is about how people cope with diversity of interests in a world of interdependence" (2019, 3). That is an apt depiction of the iZone. If each school or teacher could manage the challenges of school turnaround independently, there would be little need for compromise or consensus. But in an environment that places extraordinary demands on education professionals, the capacity to negotiate shared problem definitions, to equitably distribute the risk of new practices, and to compromise on solutions that do not alienate key constituencies is a critical resource for improvement.

These three points lead to a fourth: the iZone is both remarkable and fragile. It is remarkable for its ambitions, its commitment to instructional quality, and the determination of its leaders to chart a path that diverges from deeply entrenched professional norms and habits. iZone leaders have resisted practices and policies that boost outcomes and reputations at the cost of more meaningful changes to teaching and learning. As researchers with years of experience, we have encountered few districts that have designed and maintained an effort of this scope in a context this challenging.

Yet these very characteristics make the iZone vulnerable to internal instability and environmental turbulence. One source of vulnerability is that the student learning outcomes on which the iZone's legitimacy and reputation depend may be inconsistent in the years ahead. The possible return of ASD schools to Shelby County (some of which may end up in the iZone), the addition of new high schools, turnover of school leaders and teachers, and numerous other potential occurrences could attenuate results in the short term. The iZone will need ways to legitimize its strategy and long-term trajectory in ways that are not exclusively based on aggregated outcome measures. While short-term gains are important, they cannot be the only measure of the iZone's value.

Like many urban districts, the iZone is vulnerable to turnover within the district, and like all districts it is subject to the turbulence of state and federal policy shifts. Over the course of our study we witnessed the arrival of a new state governor, State Commissioner of Education, district superintendent, and no less than three iZone directors. Moreover, in three of our five case study schools, principals left for other positions in the district. While this is not atypical for an urban district, it is particularly

destabilizing for a system whose fundamental commitments run counter to traditional and often institutionalized practices. The iZone has been fortunate in that its early leaders were unswayed by the gravitational pull of the "old ways," but there is little guarantee that future leaders will be equally resolute.

Despite the challenges from within and without, we see ways that the iZone cannot just survive but serve as a model for other districts across the country. Toward this end, we offer four suggestions for consideration by those leading the iZone and other similar enterprises.

- **iZone leaders should continue to codify key practices and routines at the classroom, school, and district level.**

  Practices that are inscribed in materials, routines, and operating procedures, even if imperfect, represent the "iZone way'' into which new teachers, leaders, and administrators can be socialized over time. They form the curriculum around which professional learning activities are organized and become the basis for collegial interaction. Further, while not a substitute for individual expertise, codification can soften the blow of the departure of talented teachers and leaders.

- **iZone leaders should continue to construct and nurture collegial structures within and across role groups and schools.**

  The communication these structures afford is critical for maintaining coordination and coherence. Collegial structures enable the spread of ideas and knowledge, and also prevent individual groups or schools from drifting into different ways of working. Moreover, these structures function as mini R&D units that can devise novel solutions for previously unaddressed or poorly understood problems. In this way, collegial interaction and codification work together; as groups develop new ideas and methodologies, they can be written into materials and processes that benefit the entire iZone.

- **iZone leaders need to equitably distribute the risk associated with new practices.**

  The high-stakes environment can be a disincentive for principals and teachers to integrate new ideas and practices that take time to master. iZone leaders can encourage teachers and leaders to embrace more ambitious (yet uncertain) practices by rewarding efforts to engage in professional learning, enact new practices, and make incremental progress. Not only will this encourage a more long-term approach to improvement (as opposed to quick fixes), but it will mitigate the risk that reform disproportionately burdens and alienates precisely those practitioners on whom success ultimately depends.

- **District leaders must build support for the iZone among critical stakeholder groups, such as civic and business leaders, parents, and community organizations.**

  The role these groups play in supporting the iZone has largely been outside the scope of our research, but they are nonetheless critical for its long-term viability. Educational environments are notoriously turbulent and fickle as policies change, funding priorities shift, and new reforms de jour emerge. Broad-based community support that incorporates multiple stakeholder groups can buffer the iZone from instability and ensure that it survives leadership changes at the district and state levels. Support

of this nature, however, must be cultivated and maintained over time in ways that engender serious buy-in from key local actors.

We offer these suggestions because we see the iZone as a thoughtful and well-constructed enterprise that has the potential to enhance learning opportunities for students who have too often been left behind. Moreover, if successful, the iZone can provide evidence that a combination of thoughtful design, organizational learning, and long-term commitment can position urban districts as leaders in the larger effort to enhance rigor and equity in US education.

# Appendix A: Qualitative Methods

**Sampling Procedures.** The iZone study was officially launched in the Spring of 2017 when research team members met with key district leaders to discuss the launch of the study and select case study schools. At the time, the iZone was made up of 23 schools within Shelby County. We met with district leaders to select five case study schools based on the following criteria: (1) a combination of high school and elementary schools; (2) schools where the principal was not in his or her first year; (3) schools that varied in terms of collaborative structures, instructional capacity, instructional leadership and other factors associated with instructional improvement; and (4) schools where leaders were willing to participate. We then met with the five school principals to introduce them to the study and to gauge their level of interest.

**Data Collection process**. Across three school years, we conducted nearly 160 interviews with teachers, school leaders, key district personnel. We conducted between 3 and 4 data collection trips each year to understand the design and implementation of the turnaround strategy at the classroom, school, and district level. This included the way in which instructional leadership directors and content specialists guided and monitored school leaders and teachers; school leaders' ideas, practices, and routines for supporting math teachers in meeting pedagogical demands, accountability targets, and student needs; and teachers' interpretation and use of instructional tools, their perception of iZone trainings, their perception of incentives in the environment, and the challenges they encountered in instruction. At each school, we conducted focus groups with the instructional leadership teams and the math department PLC members that focused on the activities of those groups, the strategies they developed, and what they perceived as the outcomes of their efforts. We conducted observations of instructional leadership teams, PLCs, and one-on-one coaching sessions. These observations were then followed with interviews during which we discussed the observed meetings and conversations. Each study year culminated with meetings with iZone leaders to share our findings, reflect on the design of the iZone, and surface ideas for the upcoming school year.

**Data Analysis**. We conducted two cycles of qualitative coding of interviews and fieldnotes, and also wrote multiple analytic memos to distill our findings. We constructed a codebook in the first study year that defined 93 codes and sub-codes. This first cycle of coding described key features of the iZone's model for school turnaround. We initially applied codes more than 20,000 times and coded approximately 5,000 excerpts. We then defined four analytical domains that applied to two broad topic areas: a system of teaching and learning and a system of improvement: tools, problems of practice, professional learning, and incentives. We used these domains to refine theories on how the iZone developed and enacted a system of teaching and learning and a system of improvement. Both teams conducted a second round of coding to identify central themes within each domain to highlight commonalities and differences within the iZone. Finally, we wrote analytic memos for each of the four domains across both topic areas. We then collaborated as a team to use these memos in the construction of this report.

# Appendix B: School-Level Data

## Data for Elementary Schools

| | Longview | | | Baldwin | | | Woodson | | | District | State |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2016-17 | 2017-18 | 2018-19 | 2016-17 | 2017-18 | 2018-19 | 2016-17 | 2017-18 | 2018-19 | 2018-19 | 2018-19 |
| Student Enrollment | 730 | 780 | 800 | 560 | 520 | 560 | 500 | 430 | 420 | | |
| Chronic Absenteeism (%) | 19 | 13 | 21 | 27 | 17 | 15 | 18 | 13 | 19 | 18 | 13 |
| Math (% On Track or Mastered)* | 28 | 38 | 38 | 20 | 31 | 38 | 8 | 13 | 36 | 36 | 45 |
| ELA (% On Track or Mastered)* | 17 | 29 | 29 | 16 | 20 | 22 | n/a | 13 | 17 | 23 | 44 |
| Black (%) | 99 | 98 | 98 | 97 | 95 | 96 | 100 | 100 | 99 | 77 | 24 |
| Latinx (%) | 1 | 1 | 1 | 2 | 3 | 2 | 0 | 1 | 1 | 15 | 11 |
| Economically Disadvantaged (%) | 80 | 77 | 80 | 96 | 83 | 86 | 85 | 85 | 87 | 60 | 35 |
| English Learners (%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 5 |
| Students with Disabilities (%) | 14 | 15 | 15 | 16 | 18 | 19 | 17 | 15 | 16 | 12 | 14 |
| In-School Suspension (%) | 0 | 1 | 6 | 0 | 5 | 2 | 24 | 12 | 18 | 8 | 7 |
| Out-of-School Suspension (%) | 9 | 10 | 7 | 21 | 13 | 10 | 27 | 23 | 26 | 13 | 6 |

*Achievement Reported for Grades 3–5.

Data Sources: TDoE Report Cards and Data Downloads. To protect school identities, enrollment numbers are rounded to the nearest ten, and percentages are rounded to the nearest whole number.

| | Carver High School | | | Eastside High School | | | District | State |
|---|---|---|---|---|---|---|---|---|
| | 2016-17 | 2017-18 | 2018-19 | 2016-17 | 2017-18 | 2018-19 | 2018-19 | 2018-19 |
| Student Enrollment | 470 | 550 | 560 | 620 | 590 | 590 | | |
| Chronic Absenteeism (%) | 26 | 32 | 13 | 40 | 30 | 50 | 18 | 13 |
| Math (% On Track or Mastered)* | 8 | 7 | 8 | n/a | n/a | 8 | 14 | 30 |
| ELA (% On Track or Mastered)* | 8 | 6 | 10 | 6 | 6 | 9 | 13 | 38 |
| Graduation Rate | 76 | 76 | 76 | 76 | 70 | 78 | 79 | 89 |
| ACT Average | 16 | 16 | 15 | 16 | 15 | 16 | 18 | 20 |
| Black (%) | 93 | 93 | 91 | 98 | 96 | 97 | 77 | 24 |
| Latinx (%) | 6 | 7 | 8 | 2 | 3 | 2 | 15 | 11 |
| Economically Disadvantaged (%) | 78 | 75 | 79 | 89 | 74 | 76 | 60 | 35 |
| English Learners (%) | 3 | 3 | 4 | 1 | 1 | 1 | 7 | 5 |
| Students with Disabilities (%) | 18 | 15 | 19 | 16 | 17 | 19 | 12 | 14 |
| In-School Suspension (%) | 19 | 4 | 22 | 41 | 22 | 26 | 8 | 7 |
| Out-of-School Suspension (%) | 20 | 18 | 26 | 40 | 29 | 30 | 13 | 6 |

*Math achievement is mean scores for Algebra I, Algebra II, and Geometry. ELA achievement is mean scores for English I and English II.

Data Sources: TDoE Report Cards and Data Downloads. To protect school identities, enrollment numbers are rounded to the nearest ten, and percentages are rounded to the nearest whole number.

# Appendix C: Math Teacher and School Leader Surveys

**Administration**: Our study team conducted a survey of teachers of mathematics and a survey of school leaders to all elementary, middle and high schools in the iZone and a set of 9 demographically similar non-iZone priority schools during school years 2017-18 and 2018-19. The math teacher survey was administered each November through December and the school leader survey was administered each January through February. Both surveys were administered via email using multi-method follow-up procedures (email, phone, in-person). Both individual and school-level incentives were provided to volunteer participants.

**Content**: The 60-minute math teacher questionnaire addressed primarily questions about instruction and instructional beliefs (drawn from University of Pittsburgh surveys, see Correnti and Stein, 2018) with a short section on teacher learning opportunities, perceptions of school leadership, and cultural norms such as coherence and trust. The 30-minute school leader questionnaire was administered to those identified as principals, assistant principals, administrative leads for mathematics and teacher leads for mathematics (the latter receiving a form designed only for math teacher leaders, some of whom also completed the math teacher survey). Questions addressed issues such as perceptions of support, infrastructure in place (ILT, PLC, common planning time, curriculum), autonomy, barriers and strategies, leader time allocation, and expectations of leaders and teachers. Survey content was adapted for the second year based on insights from case studies and policy changes though many items were asked in both years. Copies of questionnaires are available upon request to the primary author.

**Sample**: We used a targeted teacher sample that focused on 3-7 sampled teachers per school: In elementary schools: 3rd, 4th and 5th grade-teachers whose instruction included math; in middle schools: 6th, 7th and 8th grade teachers of math only; In high schools: 9th and 10th grade teachers of math only.

For the school leader survey, we created a sample comprised of the principal and any assistant principal with responsibilities for the mathematics program, as well as the school's formally-designated administrative lead for mathematics and teacher lead for mathematics (if present). Schools ranged from 2 to 5 sampled school leaders.

**Response rate**: For the math teacher survey, response rates were 81% (104/128) in the first year and 87% (116/133) in the second year. For the school leader survey, response rates were 80% (65/81) in the first year and 72% (57/79) in the second year. All schools had multiple complete responses on the teacher surveys in both years, and all schools had one or more complete respondents on the school leader survey except for one school in the second year.

**Method**: Many individual items were combined into scales representing the constructs of interest (for additional information see Taylor, 2019; Correnti, 2019). All scales had reliabilities above 0.80 and were calculated as simple averages. Where constructs were about the school rather than about an individual, we created and analyzed those measures as school-level aggregates. Most survey analyses to date have been descriptive with no use of imputation.

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