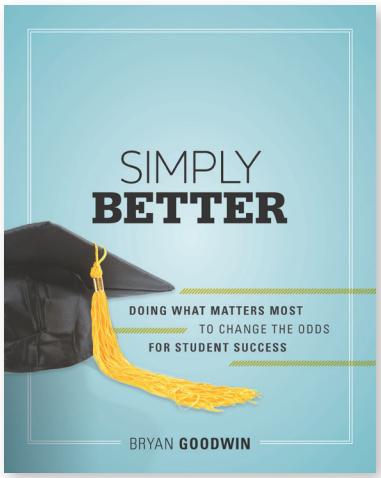
Thank you for downloading our report, *Changing the Odds for Student Success*.

You might be interested in knowing that a new book from McREL and ASCD, *Simply Better: Doing What Matters Most to Change the Odds for Student Success* (see sample chapters at ascd.org), contains many additional practical examples of the What Matters Most™ framework, along with checklists for teachers, principals, and district staff members.



Using narratives, real-life examples, and research findings, the author, Bryan Goodwin asserts that, to improve the chances of success for all children, educators don't need to do more; in fact, they may actually need to do less.

In addition, a Study Guide is available on the ASCD Web site to help you further reflect on specific ideas from the book or to aid a discussion you might have with others in a study group.

Here's what others are saying about the book

"It is easy to read and provides some fascinating examples of key principles that will help all students become successful learners. If you want to know what matters most or what matters best, then read this book."

"Goodwin does a masterful job of describing the essence of having a high achieving school, mixing critical data sets with stories that illustrate the point."

McREL

ChangingtheOdds

for Student Success: What Matters Most

A special issue of Changing Schools • *by Bryan Goodwin*

McREL

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for Student Success: What Matters Most

A special issue of Changing Schools ✹ *by Bryan Goodwin*

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About McREL

Mid-continent Research for Education and Learning (McREL) is a nationally recognized, private, nonprofit organization dedicated to changing the odds for student success by conducting research and consulting services, providing professional development, and developing products that help educators improve student achievement.

To download a free copy of this report, order print copies, access additional resources, and learn more about how McREL can help your school, district, or state change the odds for students, visit www.changetheodds.org.

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Not *another* publication. Perhaps that's what you're thinking.

After all, haven't countless commissions, organizations, and think tanks written thousands of articles, reports, and books providing educators with advice on how to raise student achievement?

And haven't numerous companies, nonprofits, and innovators developed the hundreds of programs, workshops, classroom materials, gadgets, and gizmos that now fill the exhibit halls of every major education conference?

Does the world really need another report? What *more* could be said that hasn't already been said?

At Mid-continent Research for Education and Learning (McREL), a nonprofit education research and development organization, we asked ourselves these same questions when, with generous funding from the Stupski Foundation, we launched a major, year-long effort to capture what's currently known about what it takes to ensure the success of all students, especially children of color living in poverty.

We scanned thousands of research articles, books, and studies and eventually identified and digested more than 1,000 studies and reports related to seven components of school systems and the learning needs of underserved students. After reviewing this body of knowledge, we compiled eight reports, which provide the underpinnings of this publication.*

While synthesizing and compiling this research, we arrived at an important conclusion: to improve the chances of life success for all children, educators and policymakers don't need *more* guidance, they may actually need *less*.

Distilling simplicity from complexity

In some ways, the countless studies, articles, and reports on education seem to create a phenomenon similar to what radio broadcasters refer to as signal-to-noise-ratio, a measure of how much the true signal—be it Beethoven's *Moonlight Sonata* or late-night talk radio—is corrupted by

> I would not give a fig for the simplicity on this side of complexity, but I would give my life for the simplicity on the other side of complexity.
>
> *Oliver Wendell Holmes, Sr.*

*The eight reports address the following topics: (1) College Readiness, (2) Curriculum, (3) Pedagogy, (4) Student Supports, (5) Assessment, (6) Leadership, (7) Systems Diagnostics, and (8) Our Kids (learning needs of urban students of color). They are available as free downloads at www.changetheodds.org.

static. Like the crackles and whistles that break up the signal of a faraway AM radio station, the preponderance of reports, information, and ideas in the field of education may drown out the big ideas that are the key underlying principles of what's most important when it comes to improving the odds for life success for all students.

Rather than add to the noise, we've taken a different approach. Just as biologists, physicists, and social scientists have identified laws, such as entropy, gravity, and quantum mechanics that both govern and create the complexity they observe in natural and human systems,[1] we have identified a set of "first principles." When intentionally and effectively applied, these principles have the power to transform school systems.

Our goal is not to simplify complexity into vapid platitudes. We are mindful of the observation of early-20th-century newspaper editor H. L. Mencken, who wrote, "There is always an easy solution to every human problem—neat, plausible, and wrong." Our intent is to work through the complexity to identify key principles at the heart of what it takes to help all students become successful learners.

How the odds are stacked against underserved youth

We come to this effort with an abiding sense of urgency. We know the sobering facts about the ways in which the odds of success are significantly stacked against many students, especially those born into poverty. One proxy for how well our education system is serving students is graduation rates. On this measure alone, statistics paint a grim picture:

- Nationwide, nearly one-third of all students fail to graduate with their peers.[2]
- One-third of those who do graduate are ill-prepared for either employment or college.[3]
- Only one-half of African American, Latino, and Native American students graduate on time from high school.[4]
- In some urban communities, graduation rates are as low as 17 percent.[5]

For individuals, the consequence of these failures can be catastrophic:

- Poverty rates of families headed by dropouts are more than twice that of families headed by high school graduates.[6]
- A dropout is more than 8 times as likely to be in jail or prison as a high school graduate and nearly 20 times as likely as a college graduate.[7]
- Over a lifetime, dropouts earn $260,000 less than high school graduates.[8]
- The life expectancy for high school dropouts is five years shorter than college graduates.[9]

From beating the odds to *changing* them

Certainly, every year, many kids beat these odds stacked against them. But like Geoffrey Canada, founder of the Harlem's Children Zone, who is profiled in Paul Tough's book *Whatever It Takes: Geoffrey Canada's Quest to Change Harlem and America*, we believe it's not enough to help a few kids[10] "beat the odds" and make it out of poverty. We believe America's goal should be to *change the odds*, and to do it for all kids.

Simply helping a lucky few beat overwhelming odds is not enough. Too many kids are still left behind, trying to overcome broken systems and schools. The question is: What will it take to fundamentally change the odds for all students?

Others have, of course, attempted to tackle this question. In *Changing the Odds for Children at Risk: Seven Essential Principles of Educational Programs that Break the Cycle of Poverty*,[11] University of Michigan researcher Susan Neuman identifies early childhood programs, out-of-school interventions, and community support systems that are mitigating the effects of poverty on student achievement. Her book focuses on interventions that come from outside the school, primarily because, as she told an audience at the New America Foundation, schools have not been as "malleable" or willing to adapt to student needs as community-based organizations.[12]

This report attempts to build on Neuman's review, to include interventions that schools can, and indeed, must do, to change the odds for students. Our view is that schools should be at the center of any effort to meet the needs of all students, if for no other reason than they are where millions of American students are currently educated. Those students need better opportunities today. Thus, the approach of this report is to determine principles and practices that can be employed *right now* to change the odds for students.

Building on *what works* to identify *what matters most*

In this report, we attempt to go beyond merely identifying "what works," because as several researchers have noted, the problem is not that too few programs work, but that so many things appear to work, but only *sort of*. Several years ago, Wade Carpenter, a professor at Berry College in Georgia, counted 361 "good ideas" that had appeared during a 10-year period in the pages of the respected *Phi Delta Kappan*. After reviewing the preponderance of seemingly good ideas (which included, among others, whole language, performance assessment, block scheduling, looping, and de-tracking), Carpenter wrote

> It's embarrassing. It really is. Not to mention depressing. These are only a few of the "good ideas" that were discussed in the pages of the Kappan—silver bullets that would enhance, reform, and even save American education. … It is embarrassing because all these "good ideas" have produced very limited gains. It is depressing because nearly all of them really were good ideas. But the results of all this research and publication have been less than impressive.[13]

In preparing this report, we've been mindful of what New Zealand researcher John Hattie calls the *hinge-point* (effect size of $d = .40$). An effect size is the measure of the strength or overall impact of a program or intervention being studied. Hattie writes that an effect size of .40 is strong enough for educators to see "real-world change" in student achievement.[14] It's also the threshold point at which an innovation exceeds the average effect teachers have on student achievement—that is, between $d = .20$ and $d = .40$.[15] Using this metric, many programs and approaches that appear to "work" with seemingly positive effects, are actually no more effective than average classroom teachers left to their own devices.

Finding the touchstones

In preparing this publication, we have been mindful of this hinge-point in order to avoid offering yet another litany of approaches that appear to work but, in the final analysis, provide only small, barely perceptible bumps in achievement. Our aim is to identify w*hat matters most*—those influences and approaches that stand clearly above the rest.

Over the years, McREL has conducted several meta-analyses and research syntheses to identify what works in a variety of areas, from instruction to extended learning, from school to district leadership. This research has appeared in such publications as *Classroom Instruction that Works*,[16] *School Leadership that Works*,[17] and *District Leadership that Works*.[18] These studies provide a foundation for this report. By looking at what works in classrooms, schools, and afterschool programs, as well as what works for at-risk students and school and district leaders, we've identified principles for changing the odds for students. Like the touchstones of old—black quartz tablets used to test the purity of precious metals—educators should continually return to these "touchstones" to gauge the merit and value of their endeavors.

The What Matters Most framework (see Figure 1) identifies those areas that, when addressed properly, are most likely to have positive effects on student success. Stated differently, they are high-leverage, high-pay-off areas for school systems. Briefly, the components of the framework, which we describe in the following chapters, are as follows:

- Guarantee challenging, engaging, and intentional instruction
- Ensure curricular pathways to success
- Provide whole-child student supports
- Create high-performance school cultures
- Develop data-driven, "high-reliability" systems

In subsequent documents, we will build on these observations, providing more specifics and how-to guidance for educators. In this publication, we call out deeper, first principles for changing the odds for students. In doing so, we hope to help educators answer this question: "In light of the hundreds (if not thousands) of things we might do, are we doing what matters?"

Figure 1 What Matters Most Framework

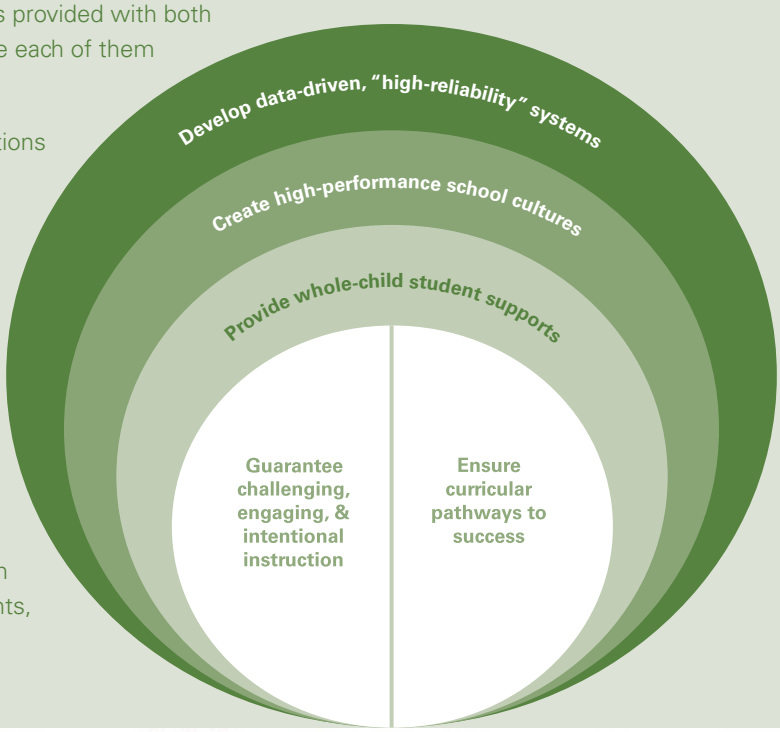
Guarantee challenging, engaging, and intentional instruction. At the core of effective systems are teachers who challenge students, develop positive relationships with them, and are intentional in their use of a broad repertoire of teaching strategies.

Ensure curricular pathways to success. High-performing systems guarantee that every student, in every classroom, no matter what the aspirations, is provided with both *challenging and personalized* learning experiences that prepare each of them for life success.

Provide whole-child student supports. Setting high expectations requires providing students with the scaffolding they need to succeed—a just-in-time, personalized response to students' cognitive, psychosocial, and academic needs.

Create high-performance school cultures. Effective schools ensure high-quality learning experiences in every classroom. At the same time, they develop a culture of high expectations for learning and behavior, which is an even more powerful predictor of student success than socioeconomic status.

Develop data-driven, high-reliability systems. High-performing school systems put data systems and processes in place to ensure high-quality learning experiences for all students, as well as real-time responses to student failures.



Guarantee *challenging, engaging,* and *intentional* instruction

Imagine two students in early autumn. Like millions of other students across America, they enter new classrooms, where the usual first-day-of-school routines unfold. They find their way to their assigned seats (or maybe scramble to sit next to friends), neatly arrange their new pencils and notebooks, write their names in their textbooks, and look up at their teachers, ready to learn.

At this moment, the two students are identical, performing exactly at grade level.

Over the course of the year, though, a silent tragedy will befall the first of these two students. It's an all-too-common occurrence, one that happens to thousands of students each year. This student will steadily slip behind his peers. By the end of the year, he will be a half year below grade level. If his academic deficits are not addressed, they may never go away. Worse, they may begin to snowball in subsequent grades as his confusion leads to frustration, apathy, and eventually a decision to drop out of school.

Meanwhile, an altogether different experience unfolds for the second student. During the year, as the seasons turn from autumn to winter, her learning will accelerate, and when spring arrives along with the budding flowers, she will be looking ahead, ready to leave for summer vacation but excited about returning for a new school year, having leapt a half year *ahead* of grade level. For her, school and learning has begun to click like never before, and new learning opportunities are likely to unfold. Going to college, which once felt like a fifty-fifty coin toss, has now become her personal goal.

What happened to these two students to make their lives take such different turns?

It was one simple variable: their teachers.

As Stanford economist Eric Hanushek has determined, the difference between a good and bad teacher can translate into as much as one year's worth of additional learning per year. A highly effective teacher (in the top 5% of all teachers) helps students learn, on average, the equivalent of a year-and-a-half of learning in a single year, while a highly ineffective one (in the bottom 5% of all teachers) only imparts a half-year of learning; thus, the difference for students between the two teachers is a year's worth of learning.[19]

The effects of bad teaching tend to linger long after students leave their classrooms. In his groundbreaking study, William Sanders analyzed the achievement of more than 100,000 students and found that the "residual effects" of poor instruction show up years later in diminished student achievement scores.[20] He also determined that students who have the misfortune of receiving a string of ineffective teachers (those ranked among the bottom fifth of teachers) for three years in a row scored as much as 50 percentile points lower on statewide assessments than those students who benefited from a three-year string of effective teachers (those ranked among the top fifth).

Unfortunately, this scenario is common. Robert Pianta, a researcher from the University of Virginia, and his colleagues closely examined the educational experiences of 994 students from across the United States in grades

1, 3, and 5 and found that nine percent of students received poor-quality instruction and emotional support in all three grades (only seven percent of students spent all three years receiving high-quality instruction and emotional support). Who were these unlucky students who received poor instruction? Disproportionately, they tended to be lower-income students.

The very students who stand to benefit most from high-quality instruction tend to be the ones further disadvantaged by poor teaching.[21] That's the bad news. The good news is that teacher distribution and teacher quality are variables that can be changed. Thus, one of the most important ways—if not *the* most important way—that school systems can change the odds for students is to ensure that every child receives the benefit of a great teacher, every year, and in every classroom.

What makes a teacher effective?

There's little mystery as to what makes one teacher more effective than another. After reviewing hundreds of meta-analyses on teaching effects, John Hattie concluded that "the current mantra, that *teachers make the difference*, is misleading" because "not all teachers have powerful effects on students."[22] He notes "it is teachers' variability in effect and impact that is critical."[23] Hattie concludes that "it is teachers *using particular teaching methods*, teachers *with high expectations for all students*, and teachers *who have created positive student-teacher relationships* that are more likely to have the above average effects on student achievement."[24] In short, decades of research suggest three behaviors that distinguish highly effective teachers:

1. Highly effective teachers challenge their students. Good teachers not only have high expectations for all students, but they also challenge them, providing instruction that develops high-order thinking skills.
2. Highly effective teachers create positive classroom environments. One of the strongest correlates of effective teaching is the strength of relationships teachers develop with students.
3. Highly effective teachers are intentional about their teaching. Good teachers are clear about what they're trying to teach, and then master a broad repertoire of instructional strategies to help students accomplish their learning goals. They not only know *what* to do to support student learning, but *how*, *when*, and *why* to do it.

Setting high expectations and challenging students

In 1965, Robert Rosenthal and Lenore Jacobson, in a now famous experiment, told a group of teachers that some of the students in their classrooms had been identified by a special Harvard test as being on the brink of rapid intellectual and academic development.[25] Unbeknownst to the teachers, the test didn't exist at all; the students had simply been randomly labeled as having special aptitudes. By the end of the experiment, many students who had been randomly labeled as special were demonstrating higher IQs than their peers.[26] Rosenthal and Jacobson termed these results the "Pygmalion effect," named for the George Bernard Shaw play *Pygmalion* about a phonetics professor (Henry Higgins) who, after accepting a bet, teaches a Cockney flower girl (Eliza Doolittle) proper etiquette and diction and successfully passes her off as a lady of upper-crust London society.[27] Rosenthal and Jacobson concluded that just as Higgins' high expectations of Eliza became a self-fulfilling prophecy, teachers' expectations of students transforms their performance.

In a review of 800 meta-analyses of education research, John Hattie notes that while some researchers have questioned the findings of the original Rosenthal experiment, 674 studies conducted since that time have confirmed its key conclusion: teacher expectations can have a powerful effect on student achievement.[28]

Exactly *how* teachers convey their expectations remains a critical variable, though. For example, the effects of simply praising students—one obvious way that teachers might convey high expectations to students—appears to be minimal.[29] Carol Dweck, a Stanford psychologist, has determined that praising students by telling them they are smart may actually have a detrimental effect on their achievement.

Dweck and her colleagues conducted an experiment in which they divided students into two groups. They consistently praised students in the first group for their ability: "Wow. You got … eight right. That's a really good score. You must be really *smart* [emphasis added] at this." The second group, they praised for effort: "Wow. You got … eight right. That's a really good score. You must have *worked* [emphasis added] really hard at this."[30]

The group of mostly adolescent students, according to Dweck, began the experiment "exactly equal."[31] Yet afterward, the students praised for the innate ability began to develop a "fixed-mindset"; that is, they believed that achievement or "smarts" is something innate, not earned, nor developed through effort. These students began to reject more challenging tasks, fearing that if they tried and failed at them, they would no longer be perceived as smart or special. On the other hand, 90 percent of those students praised for their effort were not only willing to accept challenging tasks, but actually enjoyed them.

Dweck concluded that one of the ways that great teachers stand out from others is that they have a "growth mindset." That is, they view achievement not as innate, but as changeable and often the result of hard work. In contrast, "Teachers with a fixed mindset create an atmosphere of judging. These teachers look at students' beginning performance and decide who's smart and who's dumb. Then they give up on the 'dumb' ones."[32] On the other hand, writes Dweck, "great teachers believe in the growth of the intellect and talent, and they are fascinated with the process of learning."[33]

If you were to announce to a personal trainer, "Sorry, I can't lift weights because I'm not very strong," your trainer would no doubt tell you that lifting weights makes your muscles stronger, and thus, you are able to lift more weight. What Dweck is saying, and what current brain research is confirming, is that the same principle applies to the brain. Like a muscle, it becomes stronger the more it's used.

Researchers at Carnegie Mellon University, for example, recently discovered that intensive remedial reading instruction not only improved the reading skills of struggling readers, it actually *changed their brains* by fostering the growth of new white-matter connections. These new connections may help students drown out distracting thoughts so they can focus on reading. Marcel Just, one of the study's principal researchers, said that this and other similar findings show that "we're not at the mercy of our biology. … I think that's a fruitful way to think about life and society in general."[34] Thomas Edison's well-worn adage that "genius is 1 percent inspiration and 99 percent perspiration" appears to be supported by modern brain science, which is finding that great minds can be made, not just born.

Building strong relationships with students

Merely setting high expectations for students, however, doesn't necessarily translate into success for them. In 1969, Judith Kleinfeld, then a Harvard doctoral student, traveled to Alaska, "eager to do research that mattered, to find ways of improving education for children who were not doing well in school."[35] Hoping to identify which teaching styles had the most positive impact on Native Alaskan students, she spent a year observing classroom interactions between teachers and students in two boarding schools.

Over the course of the year, Kleinfeld identified four types of teachers. The first type she calls *traditionalists*, teachers who set high expectations for students but viewed developing personal relationships with students as outside their professional purview. They set high demands for students, but they offered little academic or emotional support to help students meet those demands. Kleinfeld described one such teacher as follows:

> Mr. W is a nervous man with a perpetually strained facial expression. … During the observation, Mr. W. stood behind his desk lecturing. … He placed a summary of the main concepts of the lecture, highly technical terms, on the board. The … students dutifully wrote down the words.
>
> In a later interview, Mr. W. voiced serious concern for … students and noted that their main problem in the class was vocabulary. They couldn't understand what he was saying. …
>
> … Mr. W. mentioned, "[Some] students are afraid of me because I yell at them. Well, I do jump on them when they are slack on work.[36]

A second teacher type Kleinfeld characterized as aloof and undemanding. These are the *sophisticates*. The third type are the warm but undemanding *sentimentalists*. Only those belonging to the fourth type, the *supportive gadflies*, were successful with students. The gadflies combined "high personal warmth with high active demandingness."[37] In the classrooms of these teachers, also referred to as warm demanders, students actively participated in class discussions and were willing to work hard for their teachers, with whom they had developed a positive and mutually respectful rapport.[38]

Since 1972,[39] dozens of scholarly articles have used the term warm demander to describe this widely affirmed quality of effective teachers: setting high expectations while nurturing student growth. Hattie's meta-analyses on student achievement lends further credence to this concept, finding that one of the strongest correlates of teacher effectiveness is teacher-student relationships. The top teacher-student relationship variables associated with higher levels of student achievement are as follows:

- Nondirectivity (i.e., encouraging student-initiated and regulated activities)
- Empathy
- Warmth
- Encouragement of higher order thinking[40]

Teaching with intention

In our own review of hundreds of research articles on pedagogy, we sought to determine if teachers need to employ a different, perhaps unique, set of instructional practices with underserved children. The answer we found is "no." Very little experimental research exists to support altering teaching methods according to students' ethnic or cultural

backgrounds.[41] Kleinfeld, who went on to author many books and articles on adapting instruction to the learning styles of Native students, now concludes that "after more than 25 years of research on cultural differences in learning styles, psychologists have been unable to show that one method of teaching works better for children of one cultural group while a different method of teaching works better for children of a different cultural group."[42]

Kleinfeld acknowledges that some ethnic groups do occasionally display different ability patterns. For example, Alaskan Natives tend to demonstrate especially high levels of visual and spatial skills while performing less well on tests of English verbal ability. However, she concludes, "Just because different cultural groups have different cognitive strengths does not mean that teachers should narrowly match their teaching styles to these patterns of abilities."[43] As evidence of this observation, she points to another study she conducted early in her career.

The study was designed, she thought, to demonstrate the importance of aligning instruction with students' unique cultural learning styles. Ethnographic research at the time suggested that Native Alaskan students had strong visual memories, perhaps developed through nurture or evolved through nature, to remember small visual cues needed to navigate the vast and seemingly monotonous landscape of the Arctic tundra.

So, Kleinfeld and a colleague developed two sets of lessons for teaching the classification of animals and their place on the food chain: one was verbally oriented, the other visually oriented. They delivered both lessons to Native and non-Native students, fully expecting to find the visual lessons boosting learning for the Native students. What they found was that while the Native students "did learn more with the visual lesson . . . the Caucasian children benefited the same or more!"[44]

Kleinfeld notes that similar efforts to identify strategies that are more effective with particular ethnic or cultural groups—for example, using cooperative instead of competitive learning with African American students—have arrived at the same conclusion: The strategies tested are more effective for both groups of students.

That's not to say that teachers shouldn't attempt to put learning in context for students. Kleinfeld describes the experiences of one teacher whose first attempt to teach science to Native students in a remote Alaskan village consisted of a "boring lecture on calories and energy transformation."[45] After getting to know his students better, he designed a lesson that asked students to visit a local steam bath (an important fixture of village life) to observe the transition of water from a solid to liquid to vapor. His students came back to class engaged in their learning and excited to talk about what they observed. One might conclude that the lesson worked because it was culturally relevant, but that would miss its real strength. On a deeper level, it worked because it connected what students were learning to their prior knowledge (namely, their experience with steam baths) and focused on developing high-order thinking skills (e.g., analysis and evaluation). Both strategies are simply good instruction.

The bottom line: Effectively teaching all students does not require different strategies; rather, it requires skillful and intentional use of existing proven practices.

Going beyond *what* works: Knowing *how*, *when*, and *why* it works

McREL research conducted more than a decade ago identified nine categories of instructional strategies that have a high probability of enhancing student learning:

1. **Identifying similarities and differences**
2. **Summarizing and note taking**
3. **Reinforcing effort and providing recognition**
4. **Homework and practice**
5. **Nonlinguistic representations**
6. **Cooperative learning**
7. **Setting objectives and providing feedback**
8. **Generating and testing hypotheses**
9. **Questions, cues, and advance organizers**

The publication that reported these findings, *Classroom Instruction that Works: Research-based Strategies for Increasing Student Achievement*, noted that "no instructional strategy works equally well in all situations."[46] Simply using the strategies at random will not raise student achievement; teachers must also understand *how*, *when*, and *why* to use them. In our work to help teachers improve their instructional practices, teachers often arrive at an "aha moment" when they come to understand what has been missing from their professional practice: intentionality.

Effective teaching requires understanding not only what to do, but also why to do it: Why am I giving a pop quiz? What am I hoping to learn about my students? Why am I breaking students into small groups? What am I hoping to accomplish? What am I hoping students will learn? Why am I giving a particular writing prompt? What am I hoping to have students demonstrate?

This idea of beginning with the end in mind is, of course, not new. Grant Wiggins and Jay McTighe have long extolled the power of "backward design"[47]—starting not with textbooks or favorite lesson plans but rather with what students need to learn, and then deliberately choosing texts, lesson plans, and other classroom activities to meet their learning needs.

University of Virginia professor Carol Ann Tomlinson, a leading proponent of differentiated instruction, relates the following anecdote of one teacher's epiphany: After observing the teacher's class, in which the teacher asked students to read a book, draw one of the characters, write alternative endings, and design a new cover for the book, Tomlinson asked why she had designed her lesson the way she did. After some probing from Tomlinson, the teacher suddenly understood what she had been missing: intentionality. "Oh my gosh!" she exclaimed. "I thought all they were supposed to do was read the story and do something with it!"[48]

Hattie's synthesis of meta-analytic research affirms the value of teaching strategies when they are used thoughtfully to achieve clear instructional purposes. He concludes that students are most apt to learn at high levels when teachers clarify learning intentions, use several different teaching strategies, select the most fitting strategies, and "provide appropriate feedback to reduce the gap between where the student is and where they need to be."[49]

Final thoughts: The curious case of differentiated instruction

At this point, some readers may feel that we've given short shrift to the practice of differentiated instruction, which is aimed at meeting the needs of diverse learners, and is an idea much in vogue in education circles. Tomlinson writes that teachers who practice differentiated instruction

> accept and build upon the premise that learners differ in important ways. Thus, they also accept and act on the premise that teachers must be ready to engage students in instruction through different modalities [learning styles], by appealing to differing interests, and by using varied rates of instruction along with varied degrees of complexity.[50]

The logic behind this statement seems airtight. For years, such psychologists as Howard Gardner[51] have contended that people learn in different ways. Some are visual learners; others are kinesthetic or tactile learners, and so on. Each student, the theory goes, has a preferred learning style and comes to school every day with a unique set of prior knowledge and skills. Following this logic, the best response to this diversity of learning styles and aptitudes is for teachers to differentiate instruction, teaching students in ways that match their individual learning styles.

It all seems very logical, but there's one problem: To date, no empirical evidence exists to confirm that the total package of differentiated instruction (e.g., conducting ongoing assessments of student abilities, identifying appropriate content based on those abilities, using flexible grouping arrangements for students, and varying how students can demonstrate proficiency in their learning) has a positive impact on student achievement.[52]

One reason for this lack of evidence may simply be that no large-scale scientific study of differentiated instruction has been conducted. As any researcher will tell you, though, the absence of evidence is not evidence of absence. The lack of research itself may be due to the fact that differentiated instruction is such a large undertaking that it's difficult to implement well and thus, difficult to study. Some of Tomlinson's own research has found that even in those schools that claimed to be implementing differentiated instruction few teachers appeared to be opting for differentiation of any form.[53]

Another explanation could be that, while seemingly logical, differentiated instruction is based on some flawed premises. Some of the underpinnings of differentiated instruction, including adapting instruction to student abilities, aligning teaching to student learning styles, and providing instruction based upon individual student's interests, have yet to be confirmed by careful research:

- A meta-analysis of 61 studies of "aptitude-treatment interactions"—that is, grouping students according to ability and providing them with appropriate instructional support—found that these interventions provide more benefit to higher achieving students than to lower achieving ones and, thus, may exacerbate achievement gaps.[54]
- More than 400 studies found that aligning instruction to student learning styles has effects only slightly above what would be expected from normal teaching.[55] And even these moderate effect sizes are in doubt, according to Hattie, who notes serious methodological flaws with many of them. One concern with adapting instruction to learning styles, according to a pair of researchers who conducted a meta-analysis

of 39 studies, is the "considerable overlap" in individual learning styles, which calls into question whether reported learning style preferences "could really be deemed preferences."[56]

- 600 studies of individualized instruction (i.e., providing instruction based on students' individual interests and past learning experiences) found these efforts to be "only slightly better than regular classroom instruction."[57]

So what does all this mean? Is differentiated instruction a bad practice? Should teachers who are having success with it in their classrooms (and, undoubtedly, there are many) stop doing it?

Not at all.

These findings don't imply that differentiated instruction (or approaches similar to it) never work, just that they don't work *consistently*. Educators might still reasonably embrace differentiated instruction, with the caveat that it's not easy to do well (very little that's worth doing ever is). That appears to be the conclusion of a recent practice guide from the What Works Clearinghouse on implementing Response to Intervention (RtI). It cites the "low level" of evidence for differentiated instruction, yet still calls teachers to use the approach in their classrooms.[58]

Perhaps the real message to draw from the dearth of evidence supporting differentiated instruction is this: The extent to which teachers differentiate instruction in their classrooms is not a key variable in student success. Differentiated instruction may be more of a means to an end, a way to address the following three touchstones of teacher success.

The touchstones

Teachers who exemplify all three of these touchstones of good instruction will almost assuredly deliver great results for students.

1. Setting high expectations and delivering challenging instruction. Teacher expectations for students has a powerful influence on student achievement. The best teachers see intelligence not as something that is innate to, or fixed within students, but as something that can be nurtured and developed.
2. Fostering engaging learning environments and meaningful relationships with students. Effective teachers have qualities of warm demanders, pressing students to achieve at high levels while at the same time, developing strong nurturing relationships with them.
3. Intentionally matching instructional strategies to learning goals. The best teachers are clear about what they are teaching. They consistently monitor student progress toward learning goals and use appropriate teaching strategies to close the gap between what students know and what they are expected to learn.

Take away any of the touchstones, and teacher effectiveness, along with student success, will diminish. For example, if teachers differentiate instruction yet fail to develop strong nurturing relationships with students,

they won't be as successful as teachers who differentiate instruction *and* develop positive relationships with students. Similarly, if they deliver culturally relevant pedagogy, but set low expectations for learning, they're unlikely to raise student achievement. On the other hand, when differentiated instruction, culturally relevant pedagogy, or any other instructional approach does work, it's likely because teachers are delivering instruction that reflects all three of these touchstones.

Reflecting on What Matters Most

Questions for *teachers*

- Do my stated expectations for students reflect a growth mindset for their learning?
- Would my students characterize me as a warm demander?
- Am I clear with every lesson *what* I want students to learn and *why* I'm using a particular instructional strategy?

Ensure curricular pathways to Success

In the preceding chapter, we established that providing every student with a great teacher is critical to improving their odds for success. The question remains, however, what should great teachers teach? What curriculum should they follow to provide their students with the knowledge and skills they need to be successful in life?

This question, as it turns out, is one that has dogged educators since the time of the ancient Greek philosophers.

An age-old question

Socrates, perhaps the most famous educator of the ancient world, surveyed ancient Athens and determined that what passed for knowledge with most citizens was really just trivial information and a far cry from true wisdom.[59] So, as he walked about the stone streets of Athens with his eager band of pupils, instead of directly teaching them practical knowledge and skills (such as how to plumb a building), he taught them in the non-dogmatic style that now bears his name. Through inquiry and debate, he focused on many of the mental habits that today we call higher order thinking skills, including the ability to analyze, think logically, and question the assumptions of others, even those in positions of authority.

Two generations later, Aristotle (the pupil of Socrates' own pupil, Plato) adopted what may have been the first ever back-to-basics approach in his own school, the Lyceum. He used repetitive practice to develop good habits, morality, discipline, and reasoning abilities in his students.[60] The school's curriculum consisted of practical knowledge such as mathematics, reading and writing, natural sciences, physical education, and the humanities—history, poetry, and politics.[61] Aristotle could, no doubt, boast that his curriculum supported worldly success; after all, his most famous pupil, Alexander the Great, had conquered most of the known world.

It appears that two of the most brilliant minds of the ancient world were at odds regarding how to teach the youth of Athens: Socrates (from what we know about him from Plato) preferred an open-ended approach to curriculum, one that *expanded* students' minds, teaching them to think deeply and develop a thirst for wisdom and knowledge. Aristotle, on the other hand, believed that a more practical approach to curriculum was best: one that *molded* young minds and moral behavior through discipline and guided practice.

The question of which type of curriculum "works" best remains an open one, with debates raging from antiquity to modern times over what knowledge we should impart to students.

What we know—and *don't* know from education research

It would be nice, of course, if there were some way to put the question to an empirical test and to use research to divine which knowledge and skills create the most successful and best prepared students. However, there's really no way to do that, given the size and ever-changing nature of the K–12 curriculum. To date, no rigorous, randomized controlled trials have been conducted on

K–12 curricula to determine exactly what scope and sequence students should follow to succeed in college or the workplace.

Certainly, some curricular programs have been found to have a positive impact on student success. But studies of these programs are of a small grain size and report, for example, that a specific mathematics program has helped students perform better on a standardized measure of achievement during a limited time period.

Another body of studies has correlated certain course-taking patterns with college success. These studies tell us, for example, that students who successfully complete four years of high school English are more likely to demonstrate college readiness skills on college entrance exams, such as the ACT.[62] Likewise, students who complete Algebra II are more than twice as likely to graduate from college compared to students with less mathematical preparation.[63] One problem with these findings is they offer little insight into exactly which knowledge and skills contained within those courses were most vital to students' later academic success, and because the studies are not causal, there's no way to know whether the knowledge gained is critical to college success. It is possible that students' academic success results from their various dispositions, background knowledge, and other external factors.

We do know from research that Robert Marzano conducted for McREL that the school-level variable with the strongest apparent link to student success is "opportunity to learn"; that is, the extent to which a school (1) clearly articulates its curriculum, (2) monitors the extent to which teachers cover the curriculum, and (3) aligns its curriculum with assessments used to measure student achievement.[64] Of these three variables, aligning curriculum to assessments appears to have the strongest link with student achievement.

As Marzano noted in the 2000 McREL meta-analysis of research on school-level effects on student achievement titled, *A New Era of School Reform: Going Where the Research Takes Us*, the effect size of the first two variables is equivalent to about a seven percentile-point difference in student achievement. But when all three variables are combined, their effect size is on par with a 31 percentile-point difference in achievement.[65] The not-so-surprising conclusion to be drawn from this finding is that students perform better on tests when they've been taught the content and skills being tested.

In sum, none of this research really answers big picture curriculum questions, such as "What knowledge and skills are most important for students to learn to be successful in life?"

Certainly, many organizations have identified college readiness or workplace readiness standards. And a national effort has just been completed to identify the Common Core State Standards that define the learning that students need in order to be successful in college and the workplace. Yet, because of the lack of rigorous scientific research, these efforts, no matter how thoughtful and reasoned, remain educated guesses as to what's most important for students to learn. Moreover, to date, the efforts of organizations such as the American Diploma Project, Standards for Success, and Partnership for 21st Century Learning do not provide a complete K–12 curricular scope and sequence; at best, they only back-map expectations from college to the middle grades.

To help identify what matters most when it comes to curriculum design, we offer a pair of more modern narratives. At first blush, they seem like the two roads that diverge in the "yellow wood" of Robert Frost's

The Road Not Taken,[66] offering very different paths for reform—one that sees uniformly high standards for all students as the key to improving their life choices, the other that views uniquely individualized or personalized learning pathways as the key to maximizing students' potential.

Current practice sometimes construes these approaches as mutually exclusive. As we will illustrate, though, they are not contradictory approaches; rather, they are to be balanced. They are two critical and complementary principles. In short, unlike the choice made in the Frost poem to follow a single path and leave the other for another day, it is possible—even necessary—for education reforms to follow both paths simultaneously.

One path: A high-expectations curriculum for all

On December 7, 1982, this headline appeared in the metro section of the *Los Angeles Times*:

14 STUDENTS RETAKE TEST AFTER SCORES ARE DISPUTED—PRINCIPAL CHARGES MINORITY BIAS[67]

The story, which reported that the Educational Testing Service had accused students in a high school in East Los Angeles, California, of cheating on Advanced Placement (AP) tests, did not raise many eyebrows, as students have undoubtedly been cheating on tests since humans first touched carbon to papyrus. It likely would have passed mostly unnoticed had it not piqued the curiosity of a reporter in the Los Angeles bureau of *The Washington Post*.

Jay Mathews, who recently returned to the United States after a long overseas stint at the *Post's* China Bureau, was intrigued by a simple factoid at the heart of the incident. He asked himself, how did a place like Garfield High School, in a high-poverty, gang-infested neighborhood, "find eighteen students willing to take the AP calculus test at all?"[68]

Mathews dug deeper and discovered that the secret to the students' success was not cheating; rather, it was a singularly inspired and talented teacher: Jaime Escalante. Mathews observed Escalante's classroom for many months, watching him blend unrelenting high expectations and tough love to transform his students into true college-bound scholars. Eventually, Escalante was vindicated after 12 of his students retook the test and passed it again. Mathews recorded his observations in the book *Escalante: The Best Teacher in America*, which inspired the 1988 film *Stand and Deliver*.[69]

But the story did not end there. Years later, while researching some of the nation's best high schools, Mathews was stunned to find one such school, Mamaroneck High School in Westchester County, New York, barring students from taking AP courses. He was outraged. Here was Mamaroneck, a school regarded as one of the best in the United States, denying students access to courses that would give them a significant leg up on college success. On the other hand, Garfield, which was dramatically changing the odds for many of its low-income students, was viewed by many in Los Angeles as a lousy school because of its low scores on the state test.

The Challenge Index

At the time, Mathews was covering Wall Street, a land ruled by indices: the Dow Jones, Standard & Poor's 500, NASDAQ. He decided to create his own index to help show "why Garfield, in a neighborhood full of auto-body shops and fast-food joints, was at least as good a school as Mamaroneck, in a town of

mansions and country clubs."[70] The result was the Challenge Index, which *The Washington Post* and *Newsweek* use every year to identify and rank America's best high schools. The formula for the index is simple:

$$\frac{\text{\# of AP / IB (International Baccalaureate) tests taken by all students in a school}}{\text{\# number of graduating seniors}}$$

The Challenge Index is not without its critics, many of whom argue that it fails to take into account dropout rates or student success on the AP tests. Indeed, a growing number of schools have begun to boycott the index altogether, refusing to send data to *Newsweek* and *The Post*.[71] Mathews acknowledges that the index is a narrow measure of school performance but insists that it is narrow by design in order to highlight an important and often-overlooked metric of how well schools are preparing average students for success in college. And, by many counts, this particular outcome may be the biggest challenge facing our nation's schools.

Over the past few decades, the percentage of Americans with college degrees has increased only slightly while other countries have steadily increased their percentages of college graduated citizens. Moreover, in the United States, college graduation rates for some minority groups may be dwindling for the first time in our nation's history.[72]

According to researchers from the Manhattan Institute, only 32 percent of all students in the United States leave high school qualified to attend four-year colleges. The percentages are even lower for Black and Hispanic students, with 20 and 16 percent, respectively, leaving high school college-ready. After comparing these data with college completion rates, the researchers concluded that poor preparation for college, and not "inadequate financial aid or affirmative action policies,"[73] is the main reason for minority under-representation on college campuses.

College prep "shock treatment"

In response to these and other data, a growing number of schools and districts are adopting a new slogan, "College preparation for all," and throwing open the doors of their AP classes. According to the College Board, the company that administers the AP tests, enrollment in AP courses nationwide rose 50 percent from 2004 to 2009,[74] while the percentage of high school graduates passing an AP exam rose only 3.2 percent during the same time period.[75]

Some districts have gone so far as to place *all* students in AP and IB classes, even those otherwise enrolled in remedial courses.[76] In a 2009 article, *Newsweek* magazine likened these efforts to channel every student into rigorous college-preparatory courses as a kind of "academic shock treatment." The hope is that making students take tough classes will whip them into academic shape, forcing them to develop the cognitive muscles they need for college success. Whether this form of academic "tough love" really works remains an open question.

For openers, taking an AP class is no guarantee of passing the AP exam. A reporter in Duval County (Jacksonville), Florida, for example, discovered that while AP enrollment tripled in the county, only 23 percent of AP exams taken were passed, despite more than 80 percent of students receiving Cs or better in the classes. In the county's four lowest-performing high schools, only six percent of the AP exams resulted in passing scores.[77]

Nor does simply taking AP classes necessarily contribute to college success. Saul Geiser and his colleagues at the University of California-Berkeley examined the records of more than 80,000 students in the University of California system and determined that passing the AP exam does correlate with student success in college, but that simply taking the courses "bears little or no relationship to students' later performance in college."[78] In a 2009 editorial in *The New York Times*, Geiser concluded, "The key is not simply taking AP, but mastering the material."[79]

Mathews altered the Challenge Index after noticing an increase in the number of schools with big spikes in AP enrollment, yet dismal passing rates on the exams. "The minute I saw that Coolidge High School in the District had given a startling 750 Advanced Placement tests last May, and that only two percent of those exams had received passing scores, I knew I was in trouble," he wrote on his blog in December 2008.[80] With 750 tests taken compared with 137 graduating seniors, Coolidge's Challenge Index rating shot to 5.474, making it the top school in the Washington, D.C. metro area, even higher than H-B Woodlawn in Arlington, Virginia, where 59 percent of students had passed their exams.

Rather than kick Coolidge and schools like it off the *Newsweek* list, Mathews created a new category, a "Catching Up" list for schools with 10 percent or lower passing rates on AP exams. Still a staunch believer in the need to shine a bright light on schools that are providing more kids with access to college preparatory coursework, Mathews applauded the efforts of Coolidge's principal, who says he is using the AP tests, which are scored by outside experts and, therefore, cannot be dumbed down, to give kids in low-income neighborhoods "the icy blast of real college standards."[81]

Many of these educators insist that offering AP classes to average and below-average students is an important first step. Over time, as teachers become more comfortable teaching the curriculum and students come to understand what is expected of them, passing rates should rise. Fearing the slippery slope of lowering expectations, the "shock treatment" proponents remain convinced that providing all students with AP courses is better than nothing at all.

A path less traveled: A personalized curriculum

At nearly the same time Mathews was reporting the story of Jaime Escalante, a similar tale of an unorthodox educator caught in the crosshairs of the establishment was unfolding in the opposite corner of the country. In the small New England town of Winchester, New Hampshire, a principal with a radical vision for transforming Thayer High School had split the town in two.

A local reporter from the Keene *Sentinel*, Susan Kammeraad-Campbell, stumbled across the story when she arrived one evening in 1985 at a meeting of the Winchester school board, an ordinarily dreadfully dull assignment for a reporter.[82] As she drove up to the elementary school where the meeting

was being held, though, she noticed something odd: The parking lot was full. Inside the packed school library, she witnessed a contentious dispute among two sharply polarized factions.

The topic of debate was the board's behind-closed-doors decision to remove Thayer from Ted Sizer's Coalition of Essential Schools.* However, as Kammeraad-Campbell discovered when she dug deeper, the real issue was the school's principal, Sheldon "Doc" Dennis Littky. Between 1981 and 1984, he had reduced the school's dropout rate from 20 to 1 percent and increased the numbers of students enrolling in college from 10 to 55 percent.[83] Those accomplishments might have made Littky the most popular man in town had his methods not been so unorthodox.

Littky was convinced that the way to keep students in school was to get them *outside* of school to see how learning applied to the real world, so he worked with local businesses to create internship programs for students and changed school hours so teachers had time to hold conferences with individual students. Littky essentially created individual learning plans for each student.

A student of Ted Sizer, he believed in a "less is more" approach to learning. Believing that curriculum should be designed to foster mastery, not simply coverage, he extended class periods for his "outdoor" science teacher so that students could spend more time in the "natural laboratory," the woods surrounding Winchester. The culmination of his approach was the creation of a multidisciplinary program called Dovetail, during which students built the school's new environmental studies center and conducted a detailed historical survey of the neighboring town of Richmond.[84]

Despite the school's successes and increasing attention from regional and national media, a vocal group of critics in Winchester began to lobby the school board to remove Littky from his position. Many of those seeking his ouster feared that his iconoclastic, nonauthoritarian approach—embodied by casual attire and "mountain man" beard—ran counter to what students needed: structure and respect for authority. For example, when *The Keene Sentinel* ran a front-page photo of Thayer students watching television coverage of the space shuttle disaster that took the life of Krista McAuliffe (a teacher from nearby Concord), the newspaper received an angry letter from a reader who was outraged because some students in the photo were wearing baseball caps inside the school.

Others were scandalized when Littky allowed a pregnant teen to conduct, as her school project, a community survey on teenage pregnancy. One local business owner refused to let her conduct the survey on his store premises. (Incidentally, the student, who had been on the verge of dropping out after becoming pregnant, went on to become an honor student and her class president.)

By March 1986, a few months after the fiery board meeting, Littky's critics prevailed, and the Winchester school board fired him. Shortly after his termination, his photo appeared on the cover of the *New England Monthly* above the caption, "He's the Best Educator In New England. And He's Just Been Fired."[85]

Littky fought what he viewed as a wrongful dismissal. After a heated 18-month battle, he was finally

* From 1979 to 1984, Theodore Sizer, a professor of education at Brown University, conducted a major study of American secondary schools and concluded that the "unintentional mindlessness" of large, anonymous "shopping mall" schools "virtually guarantees inadequate work from the students" (p. vii). Through his Coalition of Essential Schools, he sought to create a more personal, democratic, and engaging form of schooling based on "five imperatives" for better schools: "(1) Give room to teachers and students to work and learn in their own appropriate ways, (2) Insist that students clearly exhibit mastery of their work, (3) Get the incentives right, for students and for teachers, (4) Focus the students' work on the use of their minds, (5) Keep the structure simple and thus flexible" (p. 214). Source: Sizer, T. (1992). *Horace's compromise: The dilemma of the American high school.* New York: Houghton Mifflin.

reinstated. His struggles became the subject of the book *Doc: The Story of Dennis Littky and His Fight for a Better School* by Kammeraad-Campbell and the ABC made-for-TV movie *A Town Torn Apart*. After his vindication, Littky stayed on at Thayer for several more years, refining his radical approach to education. Eventually, he took his vision to Providence, Rhode Island, where he started the Met Center (Metropolitan Regional Career and Technical Center). Today, Littky's organization, Big Picture Learning, supports more than 60 schools nationwide, based on the Met model, thanks in part to funding from the Gates Foundation.

Students in these schools prepare themselves for college not by spending more time in AP classrooms, but by getting out into the world, learning through internships and adult mentors, and demonstrating their learning through quarterly portfolio assessments called "exhibitions."[86] It's an approach Littky calls "treating everyone alike differently." In the book *The Big Picture: Education is Everyone's Business*, Littky writes,

> From the way we design curricula and standards to the way we design schools, we must think of the individual and what he or she needs and wants from education. I cannot state this more strongly: This is the only way schools will really work and the only way every kid will be offered the education he or she deserves.[87]

Littky blames the one-size-fits-all approach common in many high schools for students falling through the cracks and dropping out. "No matter how hard schools try," he writes, "a one-size-fits-all approach to education will always be hit or miss."[88] He insists there cannot be a uniform curriculum for every student in the country, or for every student in a single school or classroom, for that matter. Force-feeding kids a rigidly defined body of knowledge is in total opposition to what we know about learning.[89]

Personalizing learning

Littky has inspired schools and organizations to personalize learning for their students. For more than two decades, the Southern Region Education Board (SREB) has been testing, refining, and advocating for a personalized approach to education in hundreds of high schools nationwide through its High Schools that Work model. It focuses on providing every student with a rigorous foundation in academic preparation, high-quality career and technical education, and ongoing career guidance from mentors. SREB researchers have concluded that such a personalized approach is the way for high schools to raise both standards and graduation rates. For example, after examining 13 successful Georgia high schools where test scores and student graduation rates were both rising, SREB concluded that the reason these schools were successful was their two-fold effort to raise their standards while, at the same time, personalize learning for students:

> These most-improved schools were not just about rigor; they were about students seeing a purpose in what they were being asked to learn. Leaders from these schools expressed a belief that high-demand/high-quality career/technical programs help students link what they learn in the academic classroom to something that matters to them personally. School leaders expressed the opinion that quality career/technical studies played a role in keeping students in school.[90]

Research on dropping out supports this point. In a 2006 survey of high school dropouts, 47 percent said that they dropped because the "classes were not interesting."[91] As one student remarked, "they make you take classes in school that you're never going to use in life."[92] Fully 81 percent said that providing "opportunities for real-world learning (internships, service learning, etc.) to make classroom[s] more

relevant" would have increased their chances of staying in school.[93]

A growing number of career academies offer students such opportunities. To date, more than 2,500 academies exist nationwide, often as schools within schools. Typically, they offer a small group of students (around 30–60 per grade) both academic and career preparation around career themes, such as health care, finance, business, engineering, and media. A study of the outcomes of career academies on the lives of nearly 1,500 students from nine urban high schools found that eight years after graduating, students who had gone through the career academies were earning 11 percent more (or $216 more per month) than their matched peers who had not gone through the academies. The effects were particularly pronounced for young males (approximately 85 percent of whom were minority); they were earning $312 more per month than their peers who had not attended an academy.[94]

Final thoughts: It's a balancing act

Over the years, education has had its fair share of false dichotomies: whole language vs. phonics, direct instruction vs. constructivism, math fundamentals vs. application, site-based management vs. top-down district directives, and the list goes on. A simplistic interpretation of the Escalante and Littky stories might be that one illustrates the importance of college preparation, the other career preparation. We certainly don't want to add one more "sucker's choice" to this list, especially as we believe career preparation vs. college preparation is not the right message to draw from these narratives.

At its heart, Jaime Escalante's story reflects the power of high expectations. Escalante believed his students were capable of learning more challenging curricula. When confronted with the challenge, his students rose to the occasion. That same story line has, no doubt, played out in schools across the country with equally determined teachers and students challenging themselves to learn more and go farther than they (or others) thought possible. As Jay Mathews has noted, "low-scoring schools could prepare many more students for college if they committed themselves to the task. Many high schools with large numbers of students from low-income families have done so."[95] The message of the Escalante story is that every child deserves to be challenged and to have the opportunity to achieve more than he or she thought possible.

Unfortunately, it appears that, in some places, challenging all students has been translated into a rigid, one-size-fits-all curriculum. And as the dismal passing rates on the AP exam in schools that have rushed to place all students in AP classes suggest, simply challenging students is not enough. Students require adequate supports (the subject of the next chapter) to meet the challenge. Moreover, without adequate advisement and encouragement, students may struggle to connect long hours of AP homework with what they want to do with their lives.

The Littky story offers a counter-balance to translating the need to challenge students by setting higher standards *reductio ad absurdum* into a rigid, one-size-fits-all approach to student learning. Littky and others like him have shown that kids succeed when they encounter personalized learning opportunities that both challenge and motivate them. In short, the answer is not a single approach or even a dichotomous choice—college preparation vs. vocational education—but rather, a multiple pathways approach.

Likewise, the Escalante experience, which demonstrates the importance of a passionate, knowledgeable instructor guiding student learning, serves as a counter-balance to the *reduction ad absurdum* of construing a personalized approach to

education as a wholly student-guided exploration of the world, with teachers playing a passive role as mere facilitators of student learning. In a recent peer-reviewed paper, a team of researchers from the Netherlands, Australia, and the United States noted, "After a half century of advocacy associated with instruction using minimal guidance [e.g., discovery learning, experiential learning, problem-based and inquiry learning], it appears that there is no body of research supporting the technique."[96]

Lower-aptitude students in particular, the researchers noted, tend to benefit more from "stronger," teacher-directed instruction, in which they are shown, for example, the steps required to complete an algebra problem. Yet, because direct teaching methods typically require more effort, students tend to enjoy "weaker," student-directed learning more, even while learning less from it.[97] In other words, left to their own devices, many students will choose the academic path of least resistance, even when it's detrimental to their own learning. As a result, providing personalized learning experiences could harm students, especially those already performing at lower levels, if not balanced by challenging expectations and more scaffolded guidance and direction, which are removed only as students become expert learners.

Taking the path less traveled

In the November 2009 report *Ready for Tomorrow: Six Proven Ideas to Graduate and Prepare More Students for College and 21st-Century Careers*, SREB calls for school systems to create multiple pathways and "pave each pathway with a rigorous academic foundation and with rich, authentic learning drawn from a career field of particular interest to the student."[98] The SREB authors acknowledge that creating such a system is no small feat. Such changes are difficult; they require building new systems to monitor student progress, rethinking transportation, educating parents and students on the different pathways, and developing staff expertise, and they often confront, as Littky discovered in New Hampshire, entrenched ideas about how schooling ought to be done. Nonetheless, SREB asserts that through its High Schools that Work initiative, it "has demonstrated beyond any doubt that when high school leaders and teachers nurture the distinctive interests and talents of all groups of students, they can help more students stay in school and find the motivation to prepare for college, careers or for both."[99]

Fortunately, many trailblazing schools and districts across the country have shown that this *can* be done. One example is the Thornton Township High School in Harvey, Illinois, a member of SREB's High Schools that Work network. The suburban school of 2,400 in south Chicago, which enrolls a 91 percent African American population, created three new career preparation "houses" in the areas of Arts and Communication; Business, Engineering, Natural Resources and Technology (BENT); and Health and Human Services. In their sophomore year, students enroll in these "houses of excellence that provide majors and course concentrations blended with high-level college-prep studies."[100] Since making these changes three years ago, mathematics scores on the statewide assessment have shot up 23.5 percentage points and reading scores by 8.6 percent.[101]

Another example of a district-level effort to create multiple pathways is occurring in Mapleton, Colorado, an urban-fringe district serving approximately 6,000 mostly Hispanic and low-income students just north of Denver, Colorado. In 2001, the district, which had struggled to increase graduation rates for students, replaced its comprehensive high school with seven separate college-preparatory high schools (some housed as

schools within the original high schools). The programs range from an international leadership academy (featuring an IB curriculum) to an expeditionary learning-based school of the arts, with many options in between. Later, Mapleton restructured its elementary and middle schools, enabling a similar range of options for younger students. While still new, the approach can boast 100 percent of students at the MESA school and 90 percent of seniors in Mapleton High were accepted to college, earning $2.6 million in scholarships.[102] A rigorous analysis of the district-wide achievement data conducted by Kevin Welner and Jessica Allen (now a McREL researcher) at the University of Colorado-Boulder, did not identify any significant immediate gains in achievement from the effort but found it was "creating a healthier learning environment," and they "expect that continued efforts … will pay measureable dividends in the years to come."[103]

Similarly, the Chugach School District in Alaska has become famous for jettisoning grade levels in favor of providing separate learning pathways for all students. Students in the high-poverty district spread over 200 square miles are allowed and encouraged to progress at their own rate of learning, which more often than not, is an accelerated pace. Rather than waiting for their peers, they move ahead as soon as they demonstrate competency in a particular development level. Chugach also employs a less-is-more approach, providing students with cross-disciplinary, hands-on activities (such as working in a simulated city, where students play the role of architect, mayor, and judge) that are designed to help them develop deep knowledge and understanding of what they're learning. Five years into its transformation, student scores on Chugach's standardized reading assessment had risen from the 28th to the 72nd percentile. Over a four-year period, schools that adopted the Chugach model, through the Reinventing Schools Coalition, saw their writing and mathematics scores rise, respectively, 27.34 and 20.94 percent on average.[104]

The touchstones

When it comes to curriculum design—the process of determining what it is that students should learn while they are in school—two principles emerge from the research. These are the touchstones to which educators should consistently return when making curricular decisions:

1. Providing all students with high-expectations curricula. Standards and personalization are not mutually exclusive. All the trailblazing programs described rely heavily on standards. But instead of viewing standards as dictating that every student must learn the same things, in the same way, and at the same time, these programs view standards as providing important mile markers for each student's journey through learning. As a result, they are often able to accelerate student learning. When students demonstrate mastery of particular standards, they progress to the next level. In fact, of the 138 influences Hattie studied for his meta-analysis, accelerated learning ranked fifth. He found that students who were offered opportunities to move at an accelerated pace through the curriculum "surpassed non-accelerated peers of equivalent age and intelligence by nearly one grade-level."[105]

2. Providing all students with personalized learning opportunities. School systems that use standards to free themselves from the traditional conventions of curriculum and radically alter the way schooling is delivered can change the odds for their students. Standardization and individualization are sometimes seen as dichotomous—something is either standardized *or* personalized. However, in practice, standards—from standard clothing sizes to standardized electrical outlets to standard formats for digital music reproduction—have led to all manner of creativity and innovations in fashion design, electronics, and entertainment. Similarly, there are innumerable ways students might learn how to "determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas," as stated in the new Common Core State Standards.[106] Standards should not be the ends of education, but rather the beginning, the platform for creativity, innovation, and personalization.

Reflecting on What Matters Most

Questions for *teachers*

- Am I just teaching standards, or am I using them as a platform for creativity and innovation?
- Am I helping my students see a personal purpose in what they're learning?

Questions for *curriculum developers* and *central office staff members*

- Have we traced our entire curriculum from college or career readiness to kindergarten?
- Do we provide students with multiple curricular pathways that challenge them and allow them to pursue their individual interests?

Provide whole-child student supports

On a late July morning in 1977, a 30-year-old woman named Barbara Jennings gave birth to a boy at the Columbia Women's Hospital on L Street in Washington, D.C. She named the child after his father, hoping he would reconsider his "me-or-the-baby" ultimatum and assist in raising his namesake. The boy's father, however, spent much of his time in and out of jail, offering only an intermittent and often painful presence in the boy's life. Barbara eventually decided to call her son by his middle name, Lavar.

She worked at a steady but low-paying government job where she hardly earned enough to keep herself and her three children out of poverty. During Lavar's early years, they lived in too many locations to recall—from short-term rentals to Barbara's sister's places. Sometimes they were evicted, and when she couldn't pay the bills, they slept in unheated apartments.

When Lavar turned two, Barbara quit her job and applied for welfare to spend more time with her son. Though she had to live frugally, shopping at thrift stores, she felt it was worth it to be with him during his early years, the time when, she firmly believes, "a child either gets the love he needs or doesn't."[107]

When Lavar reached kindergarten age, Barbara returned to work and a $5 an hour job, leaving Lavar to walk home alone, past drug dealers on the street corners. It was 1982, and an epidemic of crack cocaine had begun to overtake the nation's capital; their neighborhood was ground zero for drug-fueled violence. Lavar grew up in a world punctuated with gunshots, sirens, and uncertainty. Everyday, upon returning home from school, he double-locked his front door and called his mother to let her know he had made it home safely.[108]

From birth, the odds stacked against Lavar were many. At least four risk factors (see Table 1) placed him in jeopardy of falling behind at school:

1. He lived in poverty.
2. He was transient.
3. His mother was unemployed.
4. His mother, when employed, worked at a low-wage job.

Table 1

Risk factors associated with lower student achievement

- Poverty
- Low birth weight
- Single parents
- Teen mothers
- Mothers who use alcohol, tobacco, or drugs
- Transience
- Child abuse and neglect
- Lack of high-quality day care
- Low-wage jobs for parents
- Unemployed parents
- Lack of access to health and medical care
- Low parent education levels
- Poor nutrition
- Lack of contact with English as the primary language

Lavar's situation is hardly unique. Nationwide, more than 50 percent of children are exposed to one or more risk factors, and fully

15 percent have been exposed to three or more.[109] Exposure to multiple risk factors has a strong negative link to student success and accounts for nearly half of the documented achievement gap between minority and nonminority students.

Children exposed to multiple risk factors typically enter school already well behind their wealthier peers. Children in poverty, for example, score as much as 60 percent lower in cognitive performance than middle-income children their age.[110] Often, they arrive at kindergarten having heard or seen 30 million fewer words than most middle-income children.[111] As a result, they only recognize two letters of the alphabet, while middle-income children know all 26 (see Table 2).[112]

Lavar's story has a happy ending. Against all odds, and due in large part to his mother's dogged persistence that gave him an abiding sense of hope and resilience, he made it through the gauntlet of drug dealers, the pessimism, and the uncertainty of his environs. The subject of Ron Suskind's Pulitzer Prize-winning articles for *The Wall Street Journal* and the book, *A Hope in the Unseen*, Lavar has since taken his father's name, Cedric. He graduated with honors from high school and Brown University, and after earning a master's degree in education from Harvard and one in social work from the University of Michigan, he returned to his community as a social worker with D.C. Child and Family Services.[113]

Cedric beat the odds, but millions of other children are not so fortunate. They come to school far less ready to learn than other children. For them, high-quality instruction and challenging curricular pathways, while necessary, are not sufficient to ensure their academic success. The good news, however, is that through a variety of early childhood interventions and ongoing whole-child supports, Cedric's story can become the norm.

Table 2

Beginning kindergarteners' school-readiness skills by socioeconomic status (SES)

School-readiness skill	Lowest SES	Highest SES
Recognizes letters of alphabet	39%	85%
Identifies beginning sounds of words	10%	51%
Counts to twenty	48%	68%
Identifies primary colors	69%	90%
Writes own name	54%	76%
Amount of time read to prior to kindergarten	25 hours	1,000 hours
Accumulated experience with words	13 million	45 million

Source: Neuman, S. B. (2003) From rhetoric to reality: The case for high-quality prekindergarten programs. *Phi Delta Kappan, 85*(4), 286–291.

An ounce of prevention

The first guiding principle for whole-child student supports reflects the Benjamin Franklin adage, "an ounce of prevention is worth a pound of cure." In many ways, students' academic struggles are like a progressive disease—harder to diagnose but easier to cure in earlier stages, and easier to detect but harder to cure in later stages. We know, for example, that if reading difficulties are left unchecked for too long, students may never catch up or they may catch up only after receiving intensive and costly interventions.

Joseph Torgesen, a researcher at the Florida Center for Reading Research at Florida State University, has found that reading interventions aimed at 9-to-12-year-olds demonstrate mixed results. With enough support, they may be able to acquire reading basics (such as decoding phonemes and comprehending individual words), but their fluency, or ability to read easily, may never improve—even after pulling out all the stops and providing them with up to 100 hours of one-to-one tutoring. Torgesen found that these intensive interventions were helpful only for "students with very mild reading problems" but did little to catch up those who had mild, moderate, or severe reading impairments.[114] Thus, he concludes, "If children's impairments in word-reading ability have reached moderate or severe levels, our current interventions cannot typically bring their reading fluency rates to the average range."[115] The result of letting reading difficulties linger unchecked is, in Torgesen's words, a "devastating downward spiral."[116] Students with reading delays read less on their own, pick up sight words at a slower rate, learn less vocabulary and academic background knowledge, and fall even further behind.

The bright spot to this otherwise grim picture is the ounce of prevention principle, which, when applied, can stop the downward spiral by providing good instruction and remediation prior to a child's third-grade year. After examining six studies of early reading interventions, Torgesen found that all of them brought at least half of the targeted students (one was successful with fully 92 percent of students), who had been reading far below grade level, back to grade level within a year.[117]

Early childhood programs

Research suggests that sensitive periods exist in brain development during which neural circuits are vulnerable to both negative and positive environmental influence.[118] Many critical brain processes take shape before the age of five, well before children ever enter formal schooling.[119] Thus, early childhood interventions are critical to student success. Kevin Gorey, an epidemiologist at the University of Windsor (Ontario, Canada), found that early childhood interventions can produce an initial bump in children's IQ (13 to 14 points on average).[120] Five years after enrollment in the programs, children's IQ scores remained higher only by nine points, on average, but they were less likely to be placed in special education programs (11% in the treatment group vs. 40% in the control group) or held back a grade (22 vs. 43%). Farther down the road, children in intensive programs showed higher high school graduation rates (48 vs. 26%) and were less likely to become welfare dependent, retain a low-socioeconomic-status classification in adulthood, or exhibit criminal behavior.

Avoiding the "washout" effect

All of that is good news, but researchers have long worried about a perceived washout effect for early childhood programs, and even the positive results in Gorey's studies demonstrate diminished effects over time. Although a 46 percent graduation rate for children in the program is better than 26 percent for

those not in the program, it still is not cause for celebration.

The waning benefits for even the best early childhood programs is well documented. The first large-scale examination of Head Start, the federally funded early childhood program in place since the late 1960s, concluded in 1985 that over time, the cognitive and socio-emotional gains, as reflected in the test scores of students who had attended Head Start programs, were not higher than the scores of disadvantaged children who had not attended the program. Critics of early childhood programs have used these findings to argue against funding early childhood interventions because any gains experienced by students "wash out within a few years."[121]

There are two points worth making here. The first is that researchers have found that while benefits in terms of IQ points tend to fade over time, students in high-quality programs demonstrate higher levels of academic achievement well into their middle school years. (And a small number of studies have reported important long-term benefits of high-quality early childhood programs, including higher graduation rates and incomes coupled with lower rates of incarceration and welfare dependency.[122]) The second point is that, just like almost anything—whether it's exercising, dieting, or learning to play the saxophone in the marching band—the benefits lessen if the practice is not sustained. Early childhood programs are no different. It doesn't mean they're not worth doing any more than we would say exercising daily is not worth doing because if we stop doing it, we'll be out of shape again. High-quality early childhood programs can boost the achievement of young learners, and the gains can be sustained. School systems can avoid the washout effect if they continue to provide additional supports for student learning in later grades.

Real-time supports for student learning

In its analysis of the world's top-performing school systems, McKinsey & Company found that one of the distinguishing characteristics of the world's best schools is monitoring systems (i.e., school reviews, examinations). The best schools have monitoring systems that identify and address learning difficulties for older students as soon as they arise, and they provide immediate interventions to support those learning needs.[123] Response to Intervention (RtI) is one such model for addressing student learning needs before they enter Torgesen's "devastating downward spiral."

RtI uses real-time classroom-assessment data to identify students as soon as they begin to fall behind, and then, using a three-tier approach of increasingly intensive interventions, ratchets up instructional support until students' learning difficulties are resolved. In an *Education Week* profile of Chula Vista Elementary School District in California, the authors describe dramatic gains in student achievement resulting from the use of RtI. The district, where 36 percent of student population are English-language learners, has been recognized by the California Association for Bilingual Education with a seal of excellence and having never missed the state's goals for adequate yearly progress—a notable feat for a district with so many students lacking fluency in English.[124] By tracking student progress, identifying struggling students, and targeting real-time supports for students who most need them, the RtI approach embodies the "ounce of prevention" maxim.

Scaffolding supports

Elena Bodrova, a McREL researcher and co-developer of the Tools of the Mind curriculum, emphasizes the importance of scaffolding, a concept first introduced in 1976 by psychologists David Wood, Jerome Bruner, and Gail Ross.[125] Scaffolding is an analogy to building construction: scaffolding that closely resembles the final shape of the building is put up while the structure is being built. Eventually, the scaffolding is removed, but only after the building can stand on its own. If the scaffolds are removed too soon, the structure may become misshapen or collapse. Bodrova writes that effective teachers provide students with scaffolding, or greater support, during the early stages of learning. Just as a building may collapse or become misshapen if the scaffolding is removed too soon, a student may develop an incomplete or inaccurate knowledge or skill if the instructional supports are removed too soon.

In the 1970s, Russian psychologist Lev Vygotsky identified what he called a student's "zone of proximal development," the difference between what students can do independently and what they can do with help or support.[126] Teachers scaffold student learning by first understanding where students are in their zone of development, identifying what they can do independently, what they can do with assistance, and what is still beyond them. Then teachers provide appropriate levels of instructional supports, or scaffolds, to help students develop the skill or desired learning. As students demonstrate an independent ability to perform the tasks and demonstrate learning, teachers gradually remove the supports. For example, for a student who is not yet capable of writing his name, the teacher may put dots on a paper in the shape of his name for the student to trace.[127] After tracing the letters in his name, the student will begin to learn how to write them and eventually be able to write his own name without any assistance from the teacher.

Key variables of student success

Simply addressing problems as they arise can feel like a futile effort for educators—a little like Sisyphus rolling his stone uphill only to watch it roll back down again. Focusing only on a student's immediate needs without addressing the deeper reasons for the academic struggles is akin to a doctor prescribing cough syrup to a patient with strep; the syrup provides some immediate relief for the sore throat, but it won't have any effect on the streptococcus bacteria that caused it.

When it comes to student learning, research points to the tremendous influence of a handful of variables as the root causes of their successes or struggles. McREL research conducted by Robert Marzano in 2000, published as *A New Era of School Reform: Going Where the Research Takes Us*, analyzed multiple influences on student achievement and found that 80 percent of the variation in student achievement can be attributed to four student-level variables:

1. Home environment
2. Prior knowledge
3. Aptitude
4. Interest and motivation[128]

That leaves just 20 percent of the variance in student success related to teachers (13%) and schools (7%). This information may be disheartening to educators, who may wonder if they really can have much impact on student achievement when so much of the variance in learning comes from outside-of-school factors. However, educators should not throw up their hands in defeat. These student-level variables are not entirely outside of their sphere of influence,

and to change the odds for students, school systems *must* address them. To understand how, we explore each of them in the following sections.

Home environment

As reported in *A New Era of School Reform*, home environment (e.g., parents reading to their children, helping them with homework, encouraging them to go to college, and taking them to the library and to cultural events) accounts for as much as 33 percent of the perceived variance in student achievement. This is far greater than less malleable measures, such as parents' level of income, education, and occupation (which combined, account for only 10 percent of the variance in student achievement).[129] Happily, this means that home environment *can* be directly addressed with programs for parents or with programs that replicate for students the benefits of positive home environments.

A meta-analysis of 31 studies (with a sample size of 133,600 students) conducted by Xitao Fan and Michael Chen found the single strongest factor in a student's home environment is the extent to which parents communicate high academic aspirations for their child. The effect size of parents communicating high expectations (d = .87) dwarfed the effect size (d = .18) of parental supervision of children (e.g., setting rules for TV watching, monitoring homework), although the weak perceived effects of supervision may be partly due to parents setting stricter rules and bird-dogging their homework *after* children begin to struggle at school.[130] Nonetheless, communicating high academic expectations is one of the most important things a parent can do to support student success.

To illustrate, we return briefly to the example of Cedric Jennings, whose home environment was a key variable in overcoming the odds stacked against him. Cedric's mother, Barbara, reinforced with dogged persistence her expectations for her son: he would not only make it through school, but he would go to college, and not just *any* college, as she made plain the afternoon she returned home with a new sweatshirt (which she could ill afford) for Cedric with the letters HARVARD emblazoned on the front.[131]

A second variable is what researchers call the *literacy environment* of the home, which accounts for 12–18 percent of the variation in children's language ability.[132] In a now famous study, researchers Betty Hart and Todd Risley spent two years observing and documenting the lives of 42 "ordinary" American families. They found that how parents interact with their children, in particular the number of words parents speak to the children between birth and age three and the extent to which their words are positive or negative, had a significant impact on their children's IQs and was a bigger predictor of student success than the parents' income, education level, or social status.[133] In their book *Meaningful Differences in the Everyday Experience of Young American Children*, Hart and Risley report that in the homes of well-educated professionals, children hear significantly more utterances and far more "encouragements" than "discouragements" (see Table 3). In contrast, in low-income homes, children hear far fewer utterances and more discouragements than encouragements. As a result, lower-income children tend to develop smaller vocabularies and lower IQ scores than children exposed to more words and encouragements at home.

The silver lining to this otherwise discouraging finding is that family literacy training has been shown to positively affect student achievement.[134] A meta-analysis of 16 studies of family literacy interventions found a strong significant effect size (d = 1.15) for

programs that provide parents with prescribed activities to work with their children on specific pre-literacy and literacy skills.[135]

One large-scale example of an organization attempting to address home environment is the Harlem Children's Zone (HCZ).[136] Approximately 10,000 children live in the one square mile that is called the Zone; nearly all live in poverty, and two-thirds score below grade level on standardized tests. The Zone's director, Geoffrey Canada, has poured social, medical, and educational services into the area and has guaranteed parents that their children will get into college if they hold up their end of the bargain and get their children to school. Canada's model, the HCZ Pipeline, provides uninterrupted support for the healthy development of children in the Zone—from conception to graduation from college. Anchored by a "Baby College" for expecting parents, and including a prekindergarten component, the HCZ Pipeline is different from other initiatives in its unwavering determination to reengineer the physical, social, and home environments in which children reside.[137]

Prior knowledge

A New Era of School Reform found that students' background knowledge, or "prior knowledge," accounts for approximately 41 percent of the variance in student achievement, an effect size of $d = 1.81$. Similar to the strong influence of home environment, this statistic may discourage educators. What, after all, can schools or teachers do about the level of knowledge students bring to the classroom?

Plenty, as it turns out. A growing body of research points to systematic vocabulary instruction as an effective way to narrow the gap for students who are economically disadvantaged, second-language learners, and those who have learning disabilities.[138] As 19th-century clergyman Henry Ward Beecher noted long ago, words are "pegs to hang ideas on." Expanding students' vocabularies in terms of content (ensuring, for example, that they understand the meaning of such words as *photosynthesis* and *denominator*) and academics (ensuring they know the difference between *summarize* and *synthesize*) provides the "pegs" upon which students can hang ideas and expand their knowledge.

In our 2008 publication, *Remove Limits to Learning with Systematic Vocabulary Instruction*, McREL noted that better readers may learn as many as seven new words a day, while struggling readers may pick up only one or two new words. Students with stronger vocabularies are more prone to enjoy reading, thus

Table 3

Utterances heard by low- and high-SES children

	Discouragements per hour	Affirmatives per hour	Total utterances per hour	Estimated total utterances at kindergarten
Low-SES families	11	5	616	13 million
High-SES families	5	32	2,153	45 million

Source: Hart and Risley. (1995). *Meaningful differences in the everyday experience of young American children.* pp. 125–6, 197–8.

reading more and expanding their vocabularies. Conversely, students who encounter many words they do not know in a text are less prone to enjoy reading, and thus, read less. As a result, a yawning gap in reading proficiency and vocabulary development widens between proficient and struggling readers. One way to close this gap is through intentional vocabulary instruction—that is, directly teaching new terms that are critical to learning content—which research has shown can have a significant, positive impact on student achievement.[139] Of course, not all words are equally important or demand the same amount of instruction time. One approach to focusing vocabulary instruction is to identify key terms embedded in standards and benchmarks and ensure that students understand these terms.

Aptitude

When the confounding variables of school, classroom, and home environment are factored out, a correlation of about .25 exists between student's innate intelligence, as measured by IQ tests, and performance on standardized achievement tests.[140] If we follow the simple formula for translating a correlation into percentage variance, squaring the correlation (i.e., multiplying 0.25 by 0.25), we find that only 6.25 percent of the observed variance in student achievement is attributable to innate intelligence. This weak correlation between aptitude and student success may come as a surprise to some, as it appears to contradict the conventional wisdom that it's "smart" kids who do well in school. However, as noted in our earlier chapter on instruction, Stanford psychologist Carol Dweck and new research on the brain are finding intelligence is not a fixed phenomenon; rather, it is something that grows over time. It seems conventional wisdom has it exactly backwards: it's not that smart kids do well in school, it's that kids who do well in school get smart.

Interest and motivation

It stands to reason that students who are more motivated to learn do better in school than those who are less motivated. As reported in *A New Era of School Reform*, "student interest" has a moderate-to-strong influence on student success, accounting for approximately 14 percent of the observed variance in achievement.[141] Until recently, though, it's been difficult to ascertain exactly what causes one student to develop the self-discipline and persistence necessary to work hard and succeed in school. New brain research, however, has begun to unlock the mystery of motivation. It suggests that the heretofore "hidden" source of motivation may reside in a part of the brain called the "rostral lateral prefrontal cortex." It's the part of the brain that appears to set humans apart from apes, providing us with the ability to set goals, regulate our behavior, and maintain concentration, which is something scientists and psychologists call "executive function."

Researchers have found that children's ability to demonstrate executive function is more predictive of school readiness than IQ or entry-level mathematics and reading skills.[142] Executive function skills—namely self-monitoring, self-control, persistence, and self-regulation—have also been singled out as key predictors of college readiness.[143] Conversely, poor self-regulation is predictive of school problems such as aggression, juvenile delinquency, and dropping out.[144]

Here again, there's an upside. With the right interventions, young children can develop executive

function skills. Indeed, one of the most effective ways to develop these skills is something that children have been doing for generations: engaging in dramatic play.

Scaffolding Early Learning (SEL), a program developed by McREL, is specifically designed to help children develop their ability to regulate their own social and cognitive behaviors.[145] In SEL classrooms, teachers are equipped with a set of special strategies to increase the value of make-believe play. Teachers learn how to stage various play centers in the classroom, where, for example, children pretend to run a bookstore, work together as firefighters to put out a fire, or serve as the crew and passengers of an airplane.

Prior to joining the play center, each child develops a "play plan" (presented as a drawing, writing, or dictation to the teacher) that identifies the role he or she will play. Throughout the play period, which lasts for up to an hour (an eternity for many four-year-olds), children must stay in their roles and learn to correct one another when someone slips out of character. As a result, they develop the ability to regulate their behavior, think creatively and abstractly (using a wooden block, for example, to represent the nozzle of a fire hose), and focus on the same task for an hour or more.

A recent study of the SEL program found that, at the end of two years, children outperformed a control group of children on four tests of executive function. In some locations, the program has become a victim of its own success. As *Time* magazine writers Po Bronson and Ashley Merryman report in the book *NurtureShock: New Thinking about Children*, the Tools of the Mind curriculum (a manifestation of the SEL program) has been so effective in Elgin, Illinois, and Midland, Texas, that the grant to study it was rescinded. The achievement of children in the program no longer scored low enough for them to be considered at-risk. McREL principal researcher Elena Bodrova, who is quick to credit teachers for students' success, told Bronson and Merryman, "When it keeps happening enough times, you start to think that it may be our program that makes the difference. It's the irony of doing interventions in the real world: being too successful to study if it's successful."[146]

Final thoughts: A $1 billion lesson

In the late 1990s, the federal government launched the 21st Century Community Learning Centers (CCLC) program, a $40 million program that grew into a $1 billion effort to provide students with a safe place to go after school to improve their achievement. A nationwide evaluation of the centers in 2005 found "wide variability in activities and services delivered across programs" and little "coordination with the school-day curriculum."[147] As a result, students randomly assigned to the afterschool centers reported that they felt safer after school, but they demonstrated no higher levels of achievement than students in the control group. This was a disappointing result, to say the least, for a $1 billion investment.[148]

That's not to say that afterschool programs never work. In 2006, McREL conducted a meta-analysis of 56 rigorous research studies on out-of-school-time programs.[149] We found a small, but significant effect size for K–2 reading programs ($d = .25$) and a larger effect size ($d = .44$) for programs designed to improve high school students' mathematics achievement. As in the CCLC study, we found a wide variation in the quality of afterschool and summer school programs. In general, we found that when out-of-school-time programs work, it's because they

- provide one-to-one tutoring in reading;
- combine recreation with learning, for example, providing natural-science field trips, gardening, sports, and cultural activities with learning; and
- develop student motivation, for example, by providing high school students with classes held on a college campus so that they see themselves as college-bound students.

When viewed through the lens of student-level influences on achievement, effective out-of-school programs directly address all three student-level influences on achievement that educators may think are outside their area of influence. To wit, effective out-of-school-time programs

- supplement student's *home environments* by offering one-on-one tutoring and homework support;
- build students' *prior knowledge* and *aptitude* with enrichment activities, such as field trips, gardening, and cultural activities; and
- address students' *interest* and *motivation* to learn by making learning fun and providing students with the opportunity to experience college first hand.

While the CCLC program has been revised to more closely align the centers with best practices, one important lesson—albeit an expensive one—that we could draw from it is that extended learning opportunities, including afterschool, weekend, and summer programs, should not simply provide custodial care for students or deliver "more of the same." Rather, these extra hours afford a unique opportunity to provide whole-child student supports that address the critical variables we have discussed here.

The touchstones

Two key principles bubble up from the research that should guide school systems thinking about how to provide students who struggle with the additional supports they need for success:

1. Providing real-time supports in keeping with the ounce-of-prevention principle. Learning difficulties are far simpler to address early. If left unchecked too long, learning difficulties may snowball to a point that even the most intensive (and costly) of interventions will produce, at best, mixed results.
2. Addressing the deep causes of student performance: home environment, prior knowledge, interest, and motivation. Educators should not consider students' environments, background knowledge, or motivation (which account for as much as 80% of the variance in student achievement) as being beyond their reach. Many programs and interventions have been shown to positively address all three, and they *must* be addressed to change the odds for students.

Like doctors in an emergency room providing triage, educators must respond in real time, providing supports students need now to keep from falling further behind. Unless educators begin to act proactively rather than reactively, they will remain in a perpetual state of emergency. School systems must address the powerful, student-level variables that students bring to school with them everyday. By doing so, they can make the inspiring stories of students like Cedric Jennings, the common everyday experiences of most children.

Reflecting on What Matters Most

Questions for *early childhood teachers*

- Am I able to identify the zone of proximal development for my students and provide each with appropriate instruction?
- Am I helping my students develop self-regulation skills through imaginative play and other activities?

Questions for *school leaders* and *central office staff members*

- Are we equipped to provide an ounce of prevention by providing students with extra learning support at the first sign of problems?
- Are we making good use of afterschool programs and other extended learning opportunities to address critical student-level variables for success?

Create high-performance

School Cultures

In the book *Everyday Survival: Why Smart People Do Stupid Things*, Laurence Gonzalez recounts how, through trial and error, aviation pioneers arrived at a counter-intuitive solution for dealing with one of the most frightening events that can occur to someone seated in the cockpit of an airplane:

> In the early days of aviation, the spin was a mysterious event, a death spiral from which pilots rarely recovered. Knowing that, a pilot who found himself in a spin would bail out if he happened to be blessed with a parachute. And then people began to notice something strange. After the pilot bailed out, the plane would sometimes right itself and fly on until it crashed or ran out of fuel. A clever pilot proposed this: the airplane wasn't at fault. The pilot was doing something to keep the airplane in the spin. Remove the pilot, and you solve the problem. Pilots began to learn how to recover from spins by doing less, not more.[150]

The problem: Pilots, frantically thrashing about at the controls, exacerbated the spin stall. The solution: Engage in a few calm, controlled, and fluid movements to right the plane.

Low-performing schools can similarly benefit from doing less, not more. A few years ago, we examined several improvement plans from around the country. Instead of focusing on a small handful of well-defined, high-impact efforts, most of the plans laid out a dizzying array of initiatives, with several action items for each. Some identified as many as 30–40 actions for a single year. That's nearly one per week!

Like pilots in those early open-seat biplanes, many schools in the "spin stall" of low-student performance appear to be frantically thrashing about at the controls—implementing canned reading, writing, and math programs; bringing teachers together to sift through data and make data-driven decisions; creating new teacher committees to focus on specific student needs; exploring new ways to engage parents in decision making; adopting new programs to improve student behavior and motivation; and bringing in experts on all manner of topics. When there's time, they may work on improving instruction.

Obviously, that's far too much activity for any school staff to keep in their heads or take seriously. Consequently, the school continues spinning out of control, which leads to more anxiety and thrashing about. If they do see improvement, it is minimal, and they are exhausted and discouraged.

More bang for the buck: Reducing variance in teaching quality

Many of the things school leaders are tempted to put into a school improvement plan have only limited influence on student achievement. To make this point, Table 4 depicts several school-level influences according to New Zealand researcher John Hattie's hinge-point effect size of $d = .40$ (see the Introduction for more about the hinge-point).[151]

Table 4

Selected school-level influences on student achievement

Strong influence Effect sizes above d = .40		Moderate influence Effect sizes between d = .20 and .40		Weak influence Effect sizes below d = .20	
Influence	ES	Influence	ES	Influence	ES
Opportunity to learn (aligning curriculum to assessments and monitoring its use in classrooms)[1]	.88	Optimizing instruction time (maximizing time spent teaching, minimizing distractions)[1]	.39	Class size (reducing classes from 25 to 15 students)[2]	.13
Decreasing disruptive behavior (programs to address behavior issues)[2]	.85*	Clear and monitored achievement goals[1] (articulating and monitoring school-wide achievement goals)	.30	Ability grouping (tracking students into different classes by ability)[2]	.12
Leadership (schools with leaders that receive high teacher ratings on key leadership behaviors)[3]	.52	Pressure to achieve (communicating academic success as a primary school goal)[1]	.27	After-school programs (out-of-school-time learning experiences, on average)[4]	.09
School size (high school size between 600 and 900 students)[2]	.43	Parental involvement (involving parents in setting and enforcing policies)[1]	.26	Cooperation (encouraging professionalism among teachers)[1]	.06
		School climate (clearly articulating and enforcing rules of behavior)[1]	.22	Multi-age classrooms (placing students of different ages/ grade-levels in the same classroom)[2]	.04
				Open classrooms (open classroom architecture and individualized instruction)[2]	.01

[1]Marzano, R. J. (2000). *A new era of school reform: Going where the research takes us.* Aurora, CO: Mid-continent Research for Education and Learning.

[2]Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement.* New York: Routledge.

[3]Waters, J. T., Marzano, R. J., & McNulty, B. A. (2003). *Balanced leadership: What 30 years of research tells us about the effect of leadership on student achievement.* Aurora, CO: Mid-continent Research for Education and Learning. **Note:** This report stated the correlation of leadership as $r = 0.25$. For comparative purposes, that correlation coefficient has been translated here as a Cohen's d effect size of $d = .52$.

[4]Lauer, P. A., Akiba, M., Wilkerson, S. B., Apthorp, H. S., Snow, D., & Martin-Glenn, M. (2004). *The effectiveness of out-of-school-time strategies in assisting low-achieving students in reading and mathematics: A research synthesis* (Updated ed.). Aurora, CO: Mid-continent Research for Education and Learning.

*Restated from Hattie's *Visible Learning*, which reports an effect size of $d = .34$. Hattie's number includes results of a meta-analysis that simply measured influence of behavioral issues on student achievement, not programs designed to address those issues. The effect of removing the results of that one meta-analysis is this much higher average effect size.

Notable in Hattie's data is that, with the exception of aligning curriculum with assessments (opportunity to learn) and adopting programs to reduce disruptive behavior in classrooms, few school-level influences stand out as critical to student achievement. That's not surprising though, given that school-level factors account for only about seven percent of the variance in student achievement while teacher influences account for 13 percent and student-level influences fully 80 percent.[152] For the most part, school-level influences tend to be distal, or indirect, influences on achievement, whereas changes in classroom environments tend to have a more direct and immediate impact on achievement. For example, clearly articulating and enforcing rules of behavior at the school level has an effect size of $d = .22$, whereas decreasing disruptive behavior in the classroom and employing effective classroom management strategies have effect sizes of $d = .85$ and $d = .52$, respectively.[153]

Like starlight, changes at the school level appear more diffuse as they spread out to classrooms where they are implemented well or poorly, but almost certainly unevenly, given the much-documented uneven quality of classroom learning environments. Researchers have found, for example, that far more variance exists among the quality of classrooms within the same school than across different schools. One examination of surveys and achievement data for more than 54,000 students over the past 30 years found that teachers have far stronger effects on student achievement than schools (in some cases, as much as twice the effect) and concluded, "the teachers students are assigned to may be more important than the schools they attend."[154] Hanushek arrived at a similar conclusion after analyzing more than 100 studies of class-size reduction initiatives. He determined that any benefits from school- or district-level policies to reduce class sizes were wiped out when teacher hiring sprees resulted in decreased teacher quality. He found that variations in teacher quality "completely dominate any effects of altered class sizes."[155]

Because teaching quality trumps almost everything else, schools get more "bang for the buck" from improvement efforts when they focus on guaranteeing high-quality instruction across the school, ensuring that no matter what classrooms students are in, they are benefitting from high-quality teaching. In our own meta-analysis of research on effective school leaders, several of the leadership responsibilities we identified explicitly relate to improving instructional quality. For example, we found strong links between student achievement and leaders who

- are *directly* involved in the design and implementation of curriculum, instruction, and assessment practices (involvement in curriculum, instruction, and assessment);
- protect teachers from issues or influences that might otherwise detract from their teaching (discipline); and
- provide teachers with the resources and materials (including staff development) they need to deliver high-quality instruction and effectively manage their classrooms (resources).

A team of researchers led by Viviane Robison at the University of Auckland, New Zealand, found that the effect size of leadership behaviors that focus on improving instruction—for example, when leaders participate directly in teacher development activities (ES = .84)—are two to three times greater than behaviors focused on organizational development, including ensuring an orderly and supportive school environment (ES = .27); aligning resources to teaching goals (ES = .31); planning,

coordinating, and evaluating teaching and curriculum implementation (ES = .42); and establishing school-level goals and expectations (ES = .42).[156]

We should note three things about these effect sizes. First, the smaller effect sizes are not inconsequential; they're just not as great as leadership behaviors that focus directly on improving instruction. Second, they are effect sizes for leadership behaviors across the board, including high-, average-, and low-performing schools. Diminished effect size may simply mean that these behaviors are less important in some environments. For example, in schools that already have an orderly environment, maintaining order is probably necessary to keep achievement from dipping, but likely won't result in significant gains in student performance. On the other hand, focusing on turning an unsafe school into an orderly one may be exactly what the doctor ordered. In other words, these leadership behaviors are beneficial in some, but not all, school environments. Focusing on teacher development, however, appears to be good practice in nearly all school environments.

Third, even smaller effect-size influences can dramatically transform school performance; that is, the whole may be greater than the sum of the parts, if they are integrated in thoughtful and strategic ways. To illustrate the impact smaller effect-size influences can have, we turn to an example that Malcolm Gladwell provides in *The Tipping Point: How Little Things Can Make a Big Difference*.[157] It is called Broken Windows theory.

Broken Windows theory and school culture

In the mid-1980s, crime rates in New York City were skyrocketing, with the city averaging more than 2,000 murders and 600,000 serious crimes each year. Entering the subway system was like, in the words of one observer, "going into the transit version of Dante's *Inferno*."[158] The transit system logged more than 15,000 felonies each year. Aggressive panhandling, pick pocketing, and petty crimes—including gang members forcing passengers to pay *them* to enter—were commonplace.

To stop the rising number of incidents, the city focused on fixing a handful of little things. They were guided by Broken Windows theory, which says, in a nutshell, that when a window is left broken on a street, it sends the message to passersby that "no one cares and no one is in charge."[159] Soon, more windows are broken and, eventually, the whole neighborhood descends into chaos.

Against the advice of those who said the city should focus on "bigger" questions of crime and making sure the subway trains ran on time, New York spent its energies (and dollars) painting over the graffiti on subway cars, cracking down on "fare beating" (people jumping over turnstiles to avoid paying fares), and ejecting people from stations for drunkenness or bad behavior. By the early 1990s, the murder rate in the Big Apple had fallen by two-thirds; felonies were cut in half city-wide and by three-quarters in the subway system. As Gladwell observes, sometimes big problems "can be reversed, can be tipped, by tinkering with the smallest details of the immediate environment."[160]

The same "tipping point" theory applies to school performance. Even innovations and influences with relatively small effect sizes are worth doing if they can be combined in mutually reinforcing or additive ways. This is what McREL discovered during a four-year study of schools that beat the odds by helping all students, including at-risk students, achieve at high academic levels.

In 2001, McREL researchers set out to determine how these high-poverty, high-performing, beat-the-odds schools differ from low-performing schools. McREL identified 739 high-performing and 738 low-performing schools with 50 percent or more of their students eligible for free and reduced-price lunch. Teachers were surveyed about their schools' performance in four key areas: (1) school environment, (2) professional community, (3) leadership, and (4) instruction, and were asked to agree or disagree with statements such as these:

- My school has an explicit statement of high expectations concerning student achievement.
- There is a safe, orderly learning environment in my school.
- Administrators, teachers, and parents share a common vision of school improvement.
- My students know their learning goals.

As reported in *High-Needs Schools: What Does It Take to Beat the Odds?*[161] several differences emerged between the perceptions of teachers in high-performing vs. low-performing schools. Teachers in the low-performing schools reported their schools were doing many of the "right" things that research says are correlated with higher levels of student achievement. For example, they were offering challenging curricula, encouraging teacher collaboration, and improving teachers' practices through high-quality professional development.

Table 5

Distinguishing characteristics of high-performing, high-needs, beat-the-odds schools

Shared mission & goals
(common vision and clear focus for resources)

Academic press for achievement
(high expectations for all)

Orderly climate
(clear and enforced rules for student behavior)

Support for teacher influence
(leadership shared with teachers)

Structure
(clear student goals, strong classroom management)

The missing ingredient—the thing that beat-the-odds schools were attending to that struggling schools were not—was their school culture. The beat-the-odds schools appeared to have aggregated many smaller influences together to create what we might call a "culture of high expectations." Individually, each of these influences (see Table 5) is only moderately correlated with student achievement. When taken together, though, they have a significant positive effect on student achievement. The beat-the-odds schools develop, with input from teachers, a vision of success and a clear focus for their improvement efforts. This vision, in turn, sets high expectations for student performance *and* behavior, creating something akin to the "work hard, be nice" slogan that serves as the guiding principle for Knowledge Is Power Program (KIPP) schools.[162]

That such well-worn school reform components as assessment and monitoring, collaboration, professional development, and individualizing instruction didn't surface as distinguishing features of beat-the-odds schools doesn't mean they're unimportant. Teachers in high-performing schools reported that these things were being addressed in their schools, as did teachers in low-performing schools. In short, these things are necessary, but

not sufficient, ingredients of reform. To make the leap from low- to high-performing, schools must transform their cultures not only in terms of the kind of learning environment they create for students, but also in the work environment they foster among the staff, volunteers, and parents.

Low-performing schools: One big, unhappy family

Tolstoy opens his novel *Anna Karenina* with the line "Happy families are all alike; every unhappy family is unhappy in its own way."[163] School cultures are no different. While high-functioning schools reflect many similar characteristics, low-performing schools display an array of dysfunctional behaviors. Charles Payne, in the book *So Much Reform, So Little Change*,[164] provides numerous examples of toxic, dysfunctional school cultures, starting with the story of Jacqueline Kingon, who recounted for readers of the *The New York Times*[165] her experience as a teacher in a high-poverty school in the Bronx that, by all counts, was in the middle of a figurative spin stall.

During her first day, Kingon feels as if she's entered the "Twilight Zone," when she notices that none of the wall clocks are set to the same time. A veteran teacher advises her to "work around it" by wearing a watch. When she finds the school's custodian, he reports that he sent requests to the district office to repair the clocks, but it was so long ago that the copy of the requisition he sent has faded from blue to white.

On the first floor of the building, Kingon discovers a "graveyard" of textbooks no longer aligned with the school's new reading program. Veteran teachers ruefully predict that the new program will probably be changed again after two or three years, just as everyone starts to get comfortable with it, because of its inevitable lack of results.

In the faculty lounge, she asks for advice on managing her classroom. A couple of veteran teachers advise screaming in her students' ears and faces. Others tell her she can avoid discipline problems by assigning easier work and suggest she think of "dumbing down" as a disciplinary technique because the children want entertainment, and easy lessons will keep them orderly and safe.

Kingon finds that dealing with disruptive students requires a six-step discipline process that reads like something out of a Franz Kafka novel. She must write up students several times, meet with their parents, endure a 7-to-10-day cooling off period, draft a report to the guidance counselors—all before notifying the principal of the problem. The other teachers in the school lack the time and energy to complete the process. When Kingon attempts to follow it, she learns that writing too many reports (including three about a boy who tried to suffocate himself with a plastic bag and throw himself from a third-story window) elicits a sharp reprimand from the principal for losing control of her classrooms. He gives her two weeks to "shape up or ship out." Eventually, she capitulates, learning to keep her head down and her disciplinary reports to the bare minimum, per the repeated advice from veteran teachers to "cover" herself.

Kingon's experience is common, especially the lack of trust and the need to cover herself, which is the heart of the problem in low-performing schools, according to Payne. Payne cites ongoing research from the Consortium on Chicago School Research to support this perspective. When the Consortium compared the 30 most highly rated schools in Chicago with 30 of the lowest performing schools, it discovered that questions related to the quality of relationships—in particular, the level of trust and respect teachers

have for one another—proved to be one of the best predictors of school performance.

The power of "can do"

In the book *Learned Optimism: How to Change Your Mind and Your Life*, Martin Seligman recounts the unintended outcomes of a laboratory experiment conducted at the University of Pennsylvania in the mid-1960s. The purpose of the experiment was to see if the dogs would become conditioned to a particular tone when it was followed by a brief, mild electrical shock (similar to a static shock) and exhibit a Pavlovian response, reacting with fear when they heard the tone.

After conditioning the dogs to the pairing of the tone with the shock, the researchers placed the dogs into a large box with two compartments separated by a low wall they could easily jump over to enter the other compartment. The scientists expected that when they rang the tone, the dogs would jump into the next compartment to avoid the coming shock. Instead, the dogs cowered and whimpered, making no attempt to avoid the coming jolts of electricity.

Seligman realized that the dogs had been "taught" to be helpless. During the conditioning, nothing they did changed the outcome (they got shocked every time); thus, they "learned that nothing they did mattered. So why try?"[166] Observing the dogs' "learned helplessness," Seligman realized that downtrodden people often exhibit similar behavior. He thus began a 20-year quest to determine how one's prevailing outlook on life, whether optimistic or pessimistic, can lead to dramatically different life choices and outcomes.

In many ways, the cultures of low-performing schools reflect a similar kind of learned helplessness. Teachers in these schools learn that nothing ever gets better and nothing they do matters, so they hunker down and wait for each new program to pass as quickly as possible. In such demoralized school cultures, technical fixes—bringing in a new reading program, creating 90-minute reading blocks, or extending the school day—rarely have much impact.

In contrast, teachers in high-performing schools believe that success is possible; they believe that as individuals and as a group, they are capable of improving student achievement. And they trust their colleagues to work as hard as they do to make it happen. Ohio State University researcher Wayne Hoy and his colleagues coined the term *academic optimism* as a way to define the cultures of high-performing schools, which display three characteristics:

1. Press for academic achievement
2. Collective efficacy (i.e., a shared belief among teachers that they can help students succeed)
3. Faculty trust in parents and students

After surveying teachers in nearly 100 schools, Hoy and colleagues determined that academic optimism was an even more powerful predictor of student achievement:

> In the same way individuals can develop learned helplessness, organizations can be seduced by pervasive pessimism. According to the pessimist view, voiced with a tired resignation, 'These kids can't learn, and there is nothing I can do about it, so why worry about academic achievement.' … Academic optimism, in stark contrast, views teachers as capable, students as willing, parents as supportive, and the task as achievable.[167]

McREL's own meta-analysis of research on effective leaders similarly points to the importance of building a "can do" school culture. Most notably, among 21 responsibilities of school leaders linked to higher

levels of student achievement, we found that effective principals

- set high, concrete goals and expectations for all students to reach those goals;
- develop a clear vision for what the school could be like and promote a sense of staff cooperation and cohesion;
- involve teachers in decision making and sharing leadership; and
- systematically celebrate teachers' accomplishments.[168]

For some, focusing on something as amorphous as organizational culture may seem hopelessly "touchy feely." Consider, though, that former General Electric CEO Jack Welch, who could hardly be accused of "touchy feely" management practices, identified building a strong corporate culture as one of the two main duties of any CEO, with the other duty being to develop leaders. Maintaining a strong company culture was so important to Welch that he passed over many seemingly good merger deals due to his concerns about cultural fit: "Frankly, I didn't want to pollute the healthy culture we had," he wrote in the book *Winning*.[169]

Final thoughts: Early wins often mean later gains

We opened this chapter drawing a parallel between the panic of early aviators in a tailspin to that of leaders and teachers in low-performing schools who may be in a similar downward spiral, unable to right themselves despite countless, maybe even frantic, attempts to do so. Just as pilots have learned to recover from spins by doing less, not more, low-performing schools can do likewise by focusing on carrying out a few simple things well.

One way for schools to adopt a less-is-more approach is to engage in what we call a *fractal experience*, a small-scale, short-term effort that results in quick, measurable gains in achievement. The term *fractal* is drawn from a phenomenon found throughout nature in such things as ferns, snowflakes, and river networks—where the smallest component of the system resembles the larger system.

Schools can adopt small-scale, carefully designed school improvement experiences that contain the same elements as a larger school-wide improvement effort (e.g., using data, setting goals, clarifying individual behaviors, and monitoring implementation). A high school we once worked with in North Carolina determined by analyzing its own data that their school's climate was a major concern and should be the initial focus of their improvement efforts. They then narrowed this focus to a simple problem: unruly behavior during passing time was creating a chaotic and sometimes unsafe environment.

As a first step, the teachers and leaders decided, collectively, that all teachers should spend the passing period standing in the doorway of their classrooms, monitoring student behavior, and greeting them as they arrived at class. Because they knew the effort would only work if every teacher in the building took part in it and stuck with it, they established clear expectations and consistently monitored the implementation of the effort. After only a few weeks, they found that tardiness and unruly behavior declined and students arrived in class more ready to learn. As a result of this experience, they could feel the culture of their school beginning to change from one of pessimism to the kind of academic optimism discussed earlier in this chapter. Moreover, they were able to build on this positive experience and use the same process to engage in larger efforts to improve the climate and culture of the school.

Often, school-wide improvement efforts bog down in implementation. In part, this is because those implementing the changes aren't convinced the efforts will pay off, or because they lose faith when they do not

readily see the fruits of their labor. In fractal experiences, schools implement small-scale improvement processes that generate quick wins—which, in turn, encourage staff to take on larger challenges. Because fractals are small, simple, and completed in a short period of time, it's easier for stakeholders to "connects the dots" between their actions and the outcomes. Quick wins help create a "can do" attitude, which is a key predictor of school success.

Rather than attempting many things and doing none of them well, schools can identify the one or two big things to do next, being careful not to overlook the school's culture. By paying attention to improving teaching and learning, as well as transforming school culture, schools eventually find that their improvement efforts have become comprehensive and systemic. In our report *Success in Sight: A Comprehensive Approach to School Improvement*,[170] we refer to this approach as "thinking systemically and acting systematically." Time and again we have seen this approach work. Schools that take this measured approach recover from spin stalls and find themselves on an upward ascent of improved attitudes, increasing optimism, and rising student performance.

The touchstones

Based on our extensive review of research, we have identified two touchstones for school-level leaders to focus on during their improvement efforts:

1. Raising the quality and reducing the variance among classrooms within the school. Researchers have observed significant variance in the quality of instruction provided to students within the same school. At the same time, leadership behaviors that focus on developing teachers appear to be much more powerful than those that focus on developing the organization. Thus, leaders would do well to focus attention and energies on improving classroom instruction.
2. Creating a culture of high expectations for academics and behavior. Improving instruction may be difficult to do in a dysfunctional school. It may feel like tilting at windmills in an otherwise chaotic, disorderly school. Thus, school leaders must also work to create high-performance cultures within the school that promote a "work hard, be nice" learning environment for students as well a can do attitude among adults.

Reflecting on What Matters Most

Questions for *school leaders*

- If visitors walked into our school for the first time today, would they say it exudes a positive culture, one that conveys high expectations for learning and behavior, where adults believe they can make a difference for students?
- What's a small change that we can make tomorrow to move our school closer to becoming a high-performance school culture?
- How many improvement efforts are underway right now in our school? Are we making a few, measured improvement efforts or thrashing about at the controls?
- What else can I do to protect teachers' time?

Develop data-driven, high-reliability district systems

On September 29, 2007, British Airways Flight 55 was approximately 37,000 feet above Marseilles, France, two hours into an 11-hour jaunt to Johannesburg, South Africa. In all, 310 souls were on board the 747, including passengers and crew. Beneath them on the ground, air controllers in Marseilles had directed an Aerolinas Argentinas flight en route from Rome to Buenos Aires to climb to the same altitude, over the same stretch of Mediterranean coast line. What happened next was reportedly "hushed up" by airline officials.[171]

More than a decade earlier, Britain's Civil Aviation Authority had put off repeated requests from pilots and others to mandate the use of Traffic Collision Avoidance Systems (TCAS) on all British aircraft, which would warn pilots if they were on a collision course with other planes. At the time, authorities had argued that the expensive system (around $200,000 per plane) would cause too many false alarms, and implementation would take years to coordinate with other European agencies.[172]

According to later reports of the incident, passengers in the rear of the British aircraft were the first to see the Argentine plane approaching. They began screaming frantically as the Airbus, which had likely reached its typical cruising speed of 537 mph, rapidly closed the distance on the British plane.

Here's where our story takes an unexpected turn.

Despite the high costs and initial bureaucratic foot dragging, the British Airways plane, like all aircraft in their fleet, *had* been fitted with a TCAS. As the Argentine plane came within a few thousand feet of the British jet, an alarm went off in the cockpit, giving the pilot a loud and insistent command to "climb, climb, climb." The captain took the controls and pointed the nose of the aircraft upward, climbing steeply and banking to the right, narrowly avoiding the other plane.

What could have been a tragic disaster was averted by a fail-safe warning system aboard the British aircraft and a well-trained pilot who knew what to do when the warning sounded. Plenty of other safety systems and processes were in place on the ground. Air-traffic controllers had access to radar screens that indicate the location of aircraft and, of course, were not supposed to put two planes on the same flight path. The pilots had been trained to be vigilant, scanning the skies for other planes. Yet these systems and processes all failed to identify the approaching disaster.

For high-reliability organizations such as the aviation industry, nuclear power plants, and oil refineries, any mistake can have disastrous consequences. Thus, they put into place multilayered systems and processes to prevent errors and to respond quickly when alarms do sound. These high-reliability or fail-safe systems are characterized by a clear commitment to error-free performance (no airline aims for anything less than 100 percent of its planes landing safely); standardized routines and expectations to ensure error-free, day-to-day performance; and finally, a healthy obsession with failure (continually looking for ways to address error patterns).

Modeling school systems after core principles of high-reliability organizations is the final component to changing the odds for students.

Setting clear, "no excuses" goals

In 2006, McREL conducted a meta-analysis of 27 studies—involving 2,714 districts and the achievement scores of 3.4 million students—that looked at the relationship between superintendent leadership behaviors and student achievement.[173] The meta-analysis found a statistically significant relationship (a positive correlation $r = .24$, which converts to $d = .49$) between how district leaders, central-office staff, and teachers perceive district leadership-related variables and student achievement. Of all the avenues superintendents might devote time and energy to—from being visible in the community to generating political support for district initiatives—we found just five leadership responsibilities significantly correlated to student achievement. All five related to keeping districts focused on district-wide goals:

1. Engaging in collaborative goal-setting
2. Establishing non-negotiable goals for achievement and instruction
3. Ensuring board alignment and support of district goals
4. Monitoring goals for achievement and instruction
5. Using resources to support instruction and achievement goals

Goal-setting is nothing new for districts; most districts and schools are required to have improvement plans. Yet, how many staff members can articulate the stated goals for student performance or the plans to raise achievement? In our experience, very few. One reason is because district improvement plans are excessively complicated. School improvement isn't simple, and the district goals and objectives reflect this complexity.

Following this logic, Wells Fargo and Southwest Airlines would have multi-tiered goals and objectives with dizzyingly complicated improvement plans stored in hefty binders. Wells Fargo has 160,000 employees working in 6,000 banks across the United States providing six different kinds of financial services. Southwest Airlines has 34,000 employees who operate 3,400 daily flights, carrying 280,000 passengers out of 64 cities on 535 airplanes. Both are sprawling companies, operating in highly competitive and complex businesses. Yet, each has simplicity and clarity of focus.

"At the end of the day, they've kept it [their strategy] simple: generating more business out of existing customers," one banking analyst told the *San Francisco Chronicle* about Wells Fargo.[174] "What we did was so simple and we kept it simple," a former Wells Fargo CEO told Jim Collins, author of *Good to Great: Why Some Companies Make the Leap and Others Don't*. "It was so straightforward and obvious that it sounds almost ridiculous to talk about it."[175] Similarly, as Chip and Dan Heath recount in the book *Made to Stick*, Southwest CEO Herb Kelleher has remarked, "I can teach you the secret to running this airline in about 30 seconds. This is it: We are THE low-fare airline. Once you understand that fact, you can make any decision about this company's future as well as I can."[176]

Research can point schools and districts to the same clarity of focus. As noted in our chapter on instruction, Robert Pianta at the University of Virginia found considerable variance in the learning experiences of students, even ones in the same school. Students have only about a 20 percent chance of receiving high-quality instruction throughout their elementary years. Armed with this information, schools and districts could narrow their focus to become high-reliability organizations, guaranteeing that every student, no matter the classroom where they find themselves, receives a world-class education from a supportive, highly effective teacher.

Attending to the core business: Great teachers and teaching

In 2007, McKinsey & Company released an analysis of top-performing school systems in the world.[177] What is most striking about their analysis is what is *not* working:

- More money: Singapore spends less per pupil than most countries, yet it is among the top performers.
- Extended school days: Finnish students begin school later and study fewer hours, yet Finland ranks fourth among the top ten school systems.
- Smaller, autonomous schools: Based on the idea that smaller was better, The Gates Foundation poured money into U.S. schools only to discover that other factors outweighed school size and freedom.

What *does* work, according to the McKinsey & Company report, is this:

- School systems that get the right people to become teachers.
- School systems that develop these people into effective instructors.
- School systems that track student performance and provide targeted support for struggling students to ensure that every child is able to succeed.

An advisor on the report, Andreas Schleicher, head of the indicators division within the Directorate for Education in the Swiss-based Organisation for Economic Cooperation and Development (OECD), addressed an audience in Dover, Delaware, in June 2008, and identified a key implication of their findings as the need for a relentless focus on ensuring high instructional quality while reducing variability in the quality of instruction every student receives.

One touchstone for school leaders, then, is to ensure high quality and low variability in the instruction provided to every child, in every classroom. At the district level, the job of superintendent and central office staff is to support high quality and low variability among schools. Consistent with the McKinsey & Company findings, nearly one-third (16 of 51) of the practices of effective district leaders we identified in our district leadership study relate to districts getting and keeping great teachers and supporting great teaching.

In a business sense, teaching and learning would be considered the core technology of a school system. It stands to reason then that district leaders should focus on this core of their "business." High-reliability organizations, for example, first focus on maintaining high levels of consistency among their routine operations by using so-called "standard operating procedures" (or SOP, in military jargon). For school systems, creating SOP doesn't mean scripting every lesson plan for teachers. It may,

however, mean developing a district-wide approach to instruction that clarifies expectations for teaching (what is known in Response to Intervention approaches as "first best instruction") and ensuring high-quality teachers are in place to deliver that instruction. Let's take a closer look at the four practices listed in Figure 2.

Hiring great teachers

Effective districts ensure that the most capable teachers are in classrooms by screening and interviewing qualified teachers and giving principals a stake in selecting them. If that sounds obvious, consider for a moment that according to an analysis of urban districts by The New Teacher Project, on average, roughly two-fifths of teachers are "forced placed" or transferred into a school with no input from principals. Moreover, many districts' drawn-out hiring processes cause them to lose stronger candidates and hire weaker ones.[178]

Adopting a flexible yet consistent approach to instruction

High-performing districts develop master plans to coordinate staff development activities and train instructional staff in a shared but flexible approach to instruction. This doesn't mean that districts provide teachers with scripted lessons; rather, they clearly define what good teaching looks like in order to encourage a common instructional language across the district and ensure consistent use of research-based strategies in every classroom.

Supporting great teaching with individualized staff development

Several practices common to high-performing districts point to the importance of providing extensive, yet coordinated, staff development efforts. As we reported in the research synthesis *McREL Insights: Professional Development Analysis*, the most effective professional development focuses on improving teachers' classroom practices through modeling and coaching and improving teachers' subject-specific pedagogy.[179] Thus, as much as possible, districts should provide teachers with individualized, classroom-based professional development within a framework of a master staff development plan.

Ensuring great teaching through evaluation and accountability

McREL's research on effective school and district leaders makes a strong case for teachers to be regularly observed and evaluated. The district's role in this process is to ensure that principals frequently observe teachers and coach them to higher levels of performance. In addition, districts should ensure that principals fairly and consistently evaluate teachers in a way that promotes better teaching and professionalism.

Let's be clear. Even the best recruitment, goal setting, staff development, and evaluation efforts will be undermined if persistently ineffective teachers remain in the classroom. In many urban districts, only a handful of teachers are terminated due to poor performance in any given year. For example, a 2007 study conducted by Research for Action of the School District of Philadelphia found that over the previous three years, on average, only four teachers out of 10,000 (less than 1/10 of 1%) had been terminated due to poor performance.[180]

For district leaders, teacher dismissal policies may feel politically like the electric "third rail" of a subway system—touch it and you die. But according to a 2003 study by Public Agenda, *Stand by Me: What Teachers*

Really Think about Unions, Merit Pay, and Other Professional Matters, nearly eight in ten teachers agree that there are at least a few teachers in their building who "fail to do a good job."[181] Moreover, during collective bargaining, nearly nine in ten teachers say that they would be open to or welcome their union focusing more on evaluating teacher quality. These data suggest that rank-and-file teachers, who may regularly inherit ill-prepared students, understand better than anyone the negative consequences of poor teaching; thus, they may be willing to meet district leaders halfway and openly discuss removal of unproductive peers.

A healthy preoccupation with failure

Let's look at the health care system to illustrate one last important attribute of high-reliability systems: healthy preoccupation with failure. In *Better: A Surgeon's Notes on Performance* (2007), Atul Gawande describes how hospitals, where failures are often life-threatening, maintain a continual focus on the prevention of failure by implementing overlapping protocols to decrease the possibility of mistakes. The protocols are evident in Gawande's description of a typical surgery preparation to remove a cancerous growth:

> The operation was not going to be difficult or especially hazardous, but the team had to be meticulous about every step. On the day of surgery, before bringing her to the operating room, the anesthesiologist double-checked that it was safe to proceed. She reviewed [the patient's] medical history and medications,

Figure 2 Research-based district practices for ensuring high-quality instruction in every classroom

1. **Hiring great teachers**
   - Screening, interviewing, and selecting teachers along with principals
   - Hiring experienced teachers
   - Directing personnel to ensure a stable yet improving and well-balanced work force
2. **Adopting a flexible yet consistent approach to instruction**
   - Adopting non-negotiable goals for achievement and instruction
   - Establishing agreement with the board president on the nature of teaching/learning strategies to be used in the district
   - Adopting instructional methodologies that facilitate efficient delivery of the district's curriculum
   - Incorporating varied and diverse instructional methodologies that allow for a wide range of learning styles that exist in a student population
3. **Supporting great teaching with individualized staff development**
   - Providing extensive teacher and principal staff development
   - Training all instructional staff in a common but flexible instructional model
   - Providing access to professional growth opportunities through the design of a master plan to coordinate in-service activities of the district
   - Adopting an instructional and resource management system supporting implementation of the district's instructional philosophy
4. **Ensuring great teaching through evaluation and accountability**
   - Using an instructional evaluation program that accurately monitors implementation of the district's instructional program
   - Tasking superintendents and district staff with observing classrooms during school visits
   - Establishing teacher evaluation as a priority for principals
   - Ensuring that principals speak with teachers about evaluation results
   - Rewarding successful teachers and terminating the employment of unsuccessful teachers

Adapted from Waters, J. T., & Marzano, R. J. (2006). *School district leadership that works: The effect of superintendent leadership on student achievement.* Denver, CO: McREL.

> looked at her labs in the computer and at her EKG. She made sure that the patient had not had anything to eat for at least six hours and had her open her mouth to note any loose teeth that could fall out or dentures that should be removed. A nurse checked the patient's name band to make sure we had the right person; verified her drug allergies with her, confirmed that the procedure listed on her consent form was the one she expected. The nurse also looked for contact lenses that shouldn't be left in and for jewelry that could constrict a finger or snag on something. I made a mark with a felt-tip pen over the precise spot where [the patient] felt the lump, so there would be no mistaking the correct location. Early that morning before her surgery, [the patient] had also had a small amount of radioactive tracer injected near her breast lump, in preparation for the sentinel lymph node biopsy.[182]

The hospital staff follows several routine processes—some as simple as verifying the patient's identity and others as complex as the injection of a radioactive tracer—to reduce the risk of failure. Because error could be catastrophic, overlapping levels of checks and of responsibility ensure that any mistake that might slip through one level is caught by another. For example, Gawande physically marks the lump with a pen and verbally confirms the nature of the operation with the patient, even though the radioactive tracer was already injected. These systems are by no means foolproof; Gawande provides numerous examples of the health system's struggles to overcome both human and systemic failures. But the point is that hospitals have an organizational obsession with failure and make continuous efforts to avoid failing.

What is the connection between what hospitals do to prepare for surgery, or what the aviation industry does to prevent crashes, and school systems?

Schools don't seem to have much in common with either enterprise, nor with other high-reliability organizations, such as nuclear power plants. But they do. A single child's academic failure may be less dramatic than a plane crash, nuclear meltdown, or death of a patient, but when a student quietly falls behind, small struggles can grow insurmountable and ultimately become catastrophic consequences for that child. Eventually, that child may fall so far behind that he or she drops out of school.

The question is this: What would school systems look like if they treated the failure of a single child with equal gravity as a nuclear meltdown or an airplane crash?

Warning lights, alarm bells, and "code red" procedures

One of the first things schools systems do if they have a "healthy preoccupation with failure" is develop sophisticated data systems—the very core of high-reliability organizations. A doctor orders a CT scan for a patient to assist in diagnosis; a pilot checks instruments to determine the state of an aircraft before taking off. Simply collecting data, though, is only half of the equation; the other half is establishing procedures to respond to the data and use lessons learned from failures to prevent reoccurrence. Tom Bellamy, a professor at the University of Washington-Bothell who studies high-reliability organizations notes that systems do occasionally fail and problems slip through.[183] Once detected, the organizations react quickly to rectify the problem.

In a school system, this might involve detecting a high truancy rate at a particular school and creating an intervention committee of teachers, central-office staff, parents, and others—an all-hands-on-deck, code red response team—to address the problem before it leads to bigger issues, such as a spike in dropout

rates. A high-reliability school district would have multiple ways to detect truancy rates; it wouldn't wait until May to learn that scores of students had been skipping class all year. These "warning lights" could come in the form of classroom teachers reporting tardies and absences, schools collecting and reporting weekly data to the district, or community members and business owners reporting truants to school officials.

James Reason, a psychologist at the University of Manchester, England, who studies high-reliability systems, refers to this as the "Swiss cheese" model.[184] Like Swiss cheese, any single layer has holes through which problems might slip. But when additional layers are added, it is increasingly unlikely that the holes within all the layers will align; a failure at one level will likely be caught at another level. Thus, high-reliability organizations depend on multiple layers to avert, monitor, and resolve failures in the system. In a school system, this looks very much like what the McKinsey report highlighted: hire the best teachers, help them be effective, and watch for indications that students need more help.

Every defect a treasure

Equally important, high-reliability organizations encourage and reward error-reporting, even if reported by those who commit the errors. In Japan, successful companies, most notably Toyota, adhere to the concept of "kaizen"—the continuous process of taking frequent and small steps on the path to improvement. Kaizen declares that "every defect is a treasure." Making and uncovering mistakes is all part of the improvement process. A kaizen culture does not develop overnight and takes vigilance to maintain, a point illustrated by Toyota's recall of eight million vehicles in response to reports of some of its cars accelerating uncontrollably. Auto industry analysts have observed that Toyota's problems arose because it lost sight of its core principle of kaizen and failed to swiftly rectify the problem before it mushroomed into a public safety and public relations fiasco.[185]

Karl Weick and Kathleen Sutcliffe provide an example of a culture that celebrates error-reporting in their 2001 book, *Managing the Unexpected: Assuring High Performance in an Age of Complexity*.[186] Admiral Tom Mercer, former captain of the nuclear aircraft carrier Carl Vinson, tells the story of a sailor on board the ship who reported that he lost his wrench. A wrench sucked into an aircraft engine could be catastrophic, potentially wrecking a multimillion dollar piece of equipment and causing the loss of life. All flight operations were halted until the wrench was found. Instead of being punished for his carelessness, the next day, the sailor was commended in front of the crew. A school-level equivalent might be a culture where teachers are encouraged, and even rewarded, for reporting difficulties; for example, notifying the principal when their efforts to help a student decode phonemes isn't working. As a result, the principal, like the ship admiral, could put "all hands on deck," providing the teacher and students with necessary supports and interventions to keep the student's reading difficulties from careening out of control.

In her book, *It's Being Done: Academic Success in Unexpected Schools*, Karin Chenoweth describes her visit to Oakland Heights Elementary School in Russellville, Arkansas. Despite having nearly three-quarters of its students qualify for free and reduced-price lunch, Oakland

Heights is a rapidly improving school where its African American students score two to three times higher on the Arkansas state test than Black students in the rest of the state. Upon arriving at the school, located about an hour west of Little Rock, Chenoweth found lists and charts and data sheets that tracked every student and every teacher. Data were the bedrock of how the school had made its dramatic improvements."[187] For example, the school's principal, Sheri Shirley, knew from her constant monitoring of data that students in one classroom were mastering significantly more "sight" words (words read automatically without being sounded out) than in other classrooms, even though all teachers were using the same strategy: going through flash cards to help students master the words.

Left unchecked, of course, students' struggles with sight words could grow into bigger problems. So Shirley observed teachers in all of the classrooms and discovered that in most, the teachers were simply reading the words to the children when they missed them. In the higher-performing classroom, the teacher provided students with "tricks" to decode and remember the word—for example, identifying a "'word within a word' that the children already knew (*stAND*)."[188] By identifying the problem and "treasuring" the defect in kaizen-like fashion, Shirley was able to apply a simple existing solution for improving students' acquisition of sight words. This two-fold process of identifying error patterns as they occur and then quickly correcting them is the heart of high-reliability organizations.

Final thoughts: Dashboards help monitor, adjust, and improve execution

Returning to the aviation metaphor, what "gauges" should leaders monitor from the "flight deck" of the district office? What alarm bells and warning lights do they need? While a number of data points are important to monitor, we suggest the two most necessary are dropout indicators and student academic performance.

Dropout indicators give districts a head start to avert the dropout trajectory of a student. Several factors are linked to a higher risk of dropping out, including lack of participation in extracurricular activities, frequent absenteeism, an unstable home environment, low family income, and having non-graduate parents.[189] These predictors are additive; as they accumulate, so does a child's likelihood of dropping out of school. By collecting these data, school systems can pinpoint students who are likely candidates for additional support.

Certainly, districts already track and rely on student performance data. But not all data systems are created equal. The data from some systems is vague, easily misinterpreted, or slow in coming, which makes it unfeasible to use the data to guide decision making. Creating a system that collects the right data is essential to high performance.

One exemplary data-collection system is in place in the Minneapolis Public Schools. An often heard complaint about high-stakes assessment and accountability is that they punish the "day shift" for shortcomings of the "night shift." In truth, many teachers do struggle to raise students' performance to grade level when there has been ineffective instruction provided the previous year. As a "value added" assessment system, the Minneapolis model accounts for prior-year student performance to measure how much learning takes place during the school year.[190] This way, a teacher who inherits a class testing on average at the 20th percentile is praised, not punished, for bringing students' scores up to the 40th percentile by the end of the school year.

Minneapolis' data system also statistically controls for free and reduced-price lunch status, English-language learner status, special education status, gender, race, guardians living at home with the child, and poverty level of the child's neighborhood. All these provide a better estimate of the true contribution of a school to student performance. Thus, the district is able to identify and learn from schools that are changing the odds for students.[191]

The touchstones

Research points to three touchstones of effective district systems, all of which reflect the approach of high-reliability organizations. School systems must focus on the following:

1. Setting clear, "no excuses" goals for teaching and learning. Just as an airline or nuclear power plant would never set a goal of being anything less than disaster free, school systems should focus on ensuring the success of 100 percent of its children. While 100 percent proficiency is certainly the aim of the No Child Left Behind Act,[192] these goals have probably not been internalized by everyone in the system. Our research suggests that high-performing systems take the time to set goals collaboratively to ensure buy-in among stakeholder groups. In addition, simply setting a goal is not enough; high-performing systems also identify clear strategies they will follow to reach their goals.
2. Attending to the "core" business of schooling: great teachers and teaching. Given the strong link between effective teaching and student success, system-wide strategies for changing the odds for students should focus on filling every classroom, in every school, with a top-drawer teacher who uses the best available teaching techniques. Stated differently, schools are in the teaching and

Reflecting on What Matters Most

Questions for *district leaders* and *central office staff members*

- If asked today, could everyone in our district articulate our goals for teaching and learning?
- What would our district look like if we treated student failure with the same gravity as high-reliability organizations treat an airplane that's off-course or a warning light going off at a nuclear power plant?
- Do we have system of alarm bells and warning lights in place with established protocols for responding to them at the earliest sign of student failure?
- Can we guarantee that every student in our district benefits from a great teacher providing great teaching within a supportive, high-performance school environment?

learning business; teaching and learning is their core technology. To minimize failures and produce high-quality day-to-day results, school systems must ensure that the "normal operations" of their "business"—who teaches and how they teach—prevent student failures.

3. Developing a healthy preoccupation with failure, prevention, and intervention. Failures occur in even the best systems. To be high-reliability organizations, school systems must adopt data and diagnostic systems that identify error patterns as soon as they occur, putting in place processes for responding to them, and learning from failures in the spirit of kaizen, or continuous improvement.

To date, most of the literature on high-reliability organizations focuses on systems guided, out of necessity, by standardized procedures and regulations. For some, the image of these systems may be of people following rigid, mechanistic tasks (for example, pilots methodically working through a lengthy preflight checklist), which is a far cry from what educators experience in the ever-changing environment of schools and classrooms where each day offers something new and unexpected. High-reliability organizations, however, are not dreary places where people mindlessly follow procedures with no ability to think creatively or innovatively. To the contrary, they are what a group of education researchers led by Wayne Hoy at Ohio State University have called "mindful" organizations. Hoy and his colleagues identified several distinguishing characteristics of high-performing schools. Among them is "deference to expertise, not authority."[193] That is, people at all levels of the system are developed as experts who are encouraged to ask questions, raise issues, and make on-the-spot decisions.

Living by the book, but not dying by it

On Sept. 26, 1983, Stanislav Petrov, a 44-year-old lieutenant colonel in the Russian army, sat in his commander's chair deep underground in a secret bunker south of Moscow. His job: to monitor data from Soviet satellites trained on the airspace between the United States and the Soviet Union.

Shortly after midnight, a red button in front of Petrov began to flash: a U.S. nuclear missile was on its way to the Soviet Union. Petrov was a critical link in the Soviet chain of command, supervising the team that monitored incoming messages from Soviet intelligence satellites. Upon first warning of a U.S. attack, he had been instructed to act fast: The missile would enter Russian airspace within minutes. To give the Soviets ample time for a counter-attack, he must report any such incident immediately to superiors.

Suddenly, a second missile appeared, then another, and another. Soon, the warning system was "roaring." Five U.S. missiles were apparently on their way, bringing nuclear annihilation to their Soviet targets.[194]

The easy thing for Petrov to have done, of course, would have been to simply follow orders, pick up the phone, and report the attack to his superiors. But, under tremendous stress, Petrov agonized over what to do. If he reported the missiles, the Soviet high command would most likely order a global counter-attack, quite possibly bringing about the end of human civilization. Yet as he later recalled, he found himself thinking, "When people start a war, they don't start it with only five missiles. You can do little damage with just five missiles." Finally, he decided to ignore the flashing screens in front of him. "I had a funny feeling in my gut," Petrov later told a *Washington Post* reporter. "I didn't want to make a mistake. I made a decision, and that was it."[195]

Petrov's instincts were right. The United States had not launched an attack; the Soviet satellite system had mistaken the sun's reflection off clouds for missiles. Petrov's actions exemplify a key characteristic of members of high-reliability systems: They are willing to live by the book, but not *die* by it. While Petrov knew the rules and regulations of his job, he also knew its true purpose was to keep mother Russia safe from attack. Raising a false alarm and bringing about an all-out nuclear war would have been contrary to that purpose. (*Note:* In a true high-reliability system, Petrov would have been rewarded for his actions. Instead, he was grilled by superiors who tried to make him a scapegoat for the incident. In the end, he was neither punished nor rewarded because doing so would have made his superiors look bad and called attention to flaws in the warning system.)

The banality of bad decisions

Contrast Petrov's story with a recent incident in Forest Hills, New York. Alexa Gonzalez, a 12-year-old junior high student wrote on her desk with a green marker: "I love my friends Abby and Faith. Lex was here 2/1/10."[196] Alexa's first mistake was writing on her desk; her second was signing her name to her handiwork. When school officials discovered the defaced property, she expected a lecture or maybe detention; this was, after all, her first offense. Instead, her principal phoned the police, who came to school, handcuffed Alexa, and led her across the street to the police precinct.

Her principal was just following the rules: New York had "zero tolerance" policies for school safety. Alexa's suspension from school was eventually rescinded, but the incident paints a dismaying picture of a school system where well-meaning adults feel compelled to "die by the book," making irrational decisions that have

detrimental effects on students. Why not simply make Alexa stay after school to clean the desk and, for good measure, every desk in the classroom?

Alexa's principal is not a bad or small-minded person. To the contrary, the principal's actions probably reflect a rational response to an irrational system, one where educators feel so hide-bound by rules, regulations, and countless programs and initiatives that they can lose sight of what matters most. As a result, they engage in behaviors that seem void of all common sense.

A more mindful way

In the Introduction of this report, we made the observation that to improve the chances of life success for all children, educators and policymakers don't need more guidance; they may actually need less. That is, they need to focus on what matters most and the key principles or "touchstones" identified throughout this report for changing the odds for students (see Table 6 for all five touchstones).

One recurring theme evident among these touchstones, and the research from which they are derived, is the clear need for high expectations to drive everything that occurs in schooling—from instruction teachers provide to the curriculum offered to students to cultures created inside schools to district-level, "no excuses" goals for student learning. Simply stated, to change the odds for students, systems must set a high bar for everyone in the system and be vigilant about making sure people meet those high expectations.

If that sounds like a harsh, unforgiving environment for learning, consider that the second recurring theme evident among these touchstones is the need to consistently nurture students as learners—with teachers that develop meaningful relationships with them, curricular pathways that tap into their individual needs and life goals, schools that support their development as learners and individuals, and district-wide systems that lend a helping a hand at the first sign of student learning difficulties.

This balance of high expectations with strong supports is not a new idea: it's reflected in Judith Kleinfeld's concept of teachers as "warm demanders,"[197] who balance expectations with nurturing, and Charles Payne's "authoritative-supportive" model of teaching, which combines high levels of intellectual demand with "holistic concern" for students,[198] or what some call the "new paternalism" in schools—schools with "prescriptive yet warm" environments where teachers are "both authoritative and caring figures."[199]

Rules are important; schools must set high expectations for learning and behavior. At the same time, they also must attend to nurturing students as scholars and individuals. As Alexa's story illustrates, maintaining this balance is not always easy. But if we set clear rules while showing concern for students, we may think twice before calling the police when a student doodles on a desk.

Get creative

Finally, we should note that these touchstones are not rules, but *principles*. As screenwriting guru Robert McKee (whose disciples have won 32 Academy Awards for screenplays) has noted, rules are different than principles.

> A rule says, "You must do it this way." A principle says, "This works... and has through all remembered time." The difference is crucial. Your work needn't be modeled after the "well-made" play; rather, it must

be well made within the principles that shape our art. Anxious, inexperienced writers obey rules. Rebellious, unschooled writers break rules. Artists master the form [the principles].[200]

These same ideas apply to educators. In mindful organizations, people follow principles, not rules. Like Stanislav Petrov, they know the rules for their jobs; Petrov understood that when the missiles appeared on his radar screen, he was supposed to pick up the phone and call his superiors. More important, though, he comprehended the guiding principles of his job—the *why* behind the *what*. As a result, he understood what to do when the rules of his job conflicted with its purpose.

In subsequent publications, we will provide more how-to guidance for making these touchstones come to life in classrooms, schools, and districts. But how-to guidance without clarity of purpose can lead to mindless, automaton-like behavior. Thus, the focus of this publication has been to help educators return to the touchstones, the *whys* of what they're doing.

By helping educators to become more mindful of the key principles of school systems, we hope that they will become master artisans, focusing their creativity and innovations on doing what matters most to change the odds for all students.

Table 6

The "changing the odds" touchstones

What Matters Most	Touchstones
Guarantee challenging, engaging, and intentional instruction	Teachers must focus on • Setting high expectations and delivering challenging instruction. • Fostering engaging learning environments and meaningful relationships with students. • Intentionally matching instructional strategies to learning goals.
Ensure curricular pathways to success	School systems must focus on • Providing all students with high-expectations curricula. • Providing all students with personalized learning opportunities.
Provide whole-child student supports	School systems must focus on • Providing real-time supports in keeping with the ounce-of-prevention principle. • Addressing the deep causes of student performance: home environment, prior knowledge, interest and motivation.
Create high-performance school cultures	School leaders must focus on • Raising the quality and reducing the variance among classrooms within the school. • Creating a culture of high expectations for academics and behavior.
Develop data-driven, high-reliability district systems	School systems must focus on • Setting clear, "no excuses" goals for teaching and learning. • Attending to the "core" business of schooling: great teachers and teaching. • Developing a healthy preoccupation with failure, prevention, and intervention.

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