ACT Insights in Education & Work

Keeping Track of Improvement in Educational Practices

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Acknowledgments

The author thanks the following individuals for offering helpful suggestions on various versions of this report: Kurt Burkum, Michelle Croft, Ty Cruce, Lisa Hansel, Amy Hightower, Ellen Mandinach, Jean Rutherford, Richard Sawyer, and Laura Schwalm.

Contents

Overview

School district leaders have an important role to play in school improvement. They are in a position to create systems to improve teaching and learning from preschool through twelfth grade. To guide these improvement efforts, district leaders—and the school board members and community leaders who work with them—can benefit from indicators that provide feedback on their school system's progress. These indicators might fit into four categories:

1. **Academic performance indicators** can be used to monitor student performance and progress in different subject areas as they move through the grades, identifying whether students are on track to graduate from high school ready for college and other future learning opportunities.
2. **Behavior, attitude, and climate indicators** can be used to assess students' ongoing development of desired academic and social behaviors and their desire for further learning, as well as the quality of the learning environment in each school.[1]
3. **Practice indicators** can be used to keep track of whether educators across the district are making progress in developing systems to improve teaching and learning.
4. **Community environment indicators** can be used to learn the extent to which interventions in students' out-of-school lives are creating a more favorable environment for student learning and school improvement.[2] District leaders can work with local nonprofit organizations and public agencies to promote these interventions and encourage students and their families to participate.

Practice Areas and Indicators

This report focuses on the third indicator category—indicators of improvement in educational practices. Audiences for the report include district leaders, school board members, community leaders, and parents. For these audiences, information on the district's progress in implementing capacity-building educational practices can be a valuable supplement to data on student outcomes.

We address practices in six key areas taken from a review of research literature and from the ACT Core Practice Framework, which was developed from case study research in more than 550 higher- and average-performing schools in 20 states from 2000 to 2010.[3] The six practice areas are:

1. Develop or adopt, refine, and use a written district curriculum that describes what students should learn in each grade/course and subject.
2. Teach a content-rich curriculum in the early grades.
3. Use data from multiple sources to guide improvements in teaching and learning.
4. Encourage teachers to collaborate routinely around curriculum, instruction, and assessment.
5. Develop a coaching system for teachers.

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[1] Behavior, attitude, and climate indicators may include student attendance, discipline, and results from surveys of students, teachers, or parents.

[2] Community environment indicators may include results from parent and community surveys about neighborhood safety, housing, and health care, and surveys of students about their use of learning opportunities outside of school. These community indicators are likely to be related to student behavioral indicators such as attendance and discipline. The importance of these factors in providing a favorable environment for school improvement efforts is discussed in Anthony Bryk et al., *Organizing Schools for Improvement: Lessons from Chicago* (Chicago, IL: University of Chicago Press, 2010).

[3] We use the term "practice areas" rather than "practices" because each identified practice area includes a variety of specific practices. For additional information on the district, school, and classroom practices described in the ACT Core Practice Framework, see *Rising to the Challenge of College and Career Readiness: A Framework for Effective Practices* (ACT, 2012). Other ACT reports on the subject of educator practices include ACT, *On Course for Success: A Close Look at Selected High School Courses That Prepare All Students for College and Work* (Iowa City, IA: ACT, 2006); Chrys Dougherty, *College and Career Readiness: The Importance of Early Learning* (ACT, 2013); and Dougherty, *How School District Leaders Can Support the Use of Data to Improve Teaching and Learning* (ACT, 2015).

6. Communicate with parents about their children's academic progress and what their children are expected to learn.

These practice areas were chosen because they can increase a district's capacity to address a wide range of specific problems related to student learning.[4] Because school district leaders must identify the practice areas in which they want to focus and keep track of improvement in the chosen areas, the discussion of each practice area contains the following sections:

Description: What practices in this area might educators seek to implement?

Potential Benefits: How are practices in this area likely to be beneficial if they are well implemented?

Assessing Need: What warning signs can inform district leaders that they need to pay more attention to making improvements in this practice area?

Assessing Implementation: How can district leaders tell whether practices in this area are being well implemented?

The following box contains an overview of collecting data relevant to assessing need and implementation. Later sections contain ideas for collecting implementation data related to each practice area.

Collecting Data to Assess Need and Implementation

Much of the information that district leaders need to assess practices may be found in schools and classrooms. So how can district leaders gather the necessary information? They can learn a lot from informal conversations, especially if they cultivate an atmosphere of trust and free exchange of ideas and show interest in learning from others' suggestions and concerns. To make sure that they are hearing from a representative sample of individuals, district leaders can supplement this informally acquired knowledge with information from other sources:

Surveys of teachers and school leaders that ask carefully worded questions designed to elicit the needed information. The survey should also have room for (anonymous) comments in response to the survey questions.[5]

Utilization levels of a district website where curriculum and associated resources are shared.

Classroom visits conducted in a representative sample of classrooms in different grades and subject areas.

External audits or reviews conducted by organizations hired to gather evidence on the implementation and impact of specific practices.

District administrative documents such as budgets and meeting schedules that can be used to track the planning and resources devoted to carrying out a given practice.

[4] Thus, an approach that begins by focusing on specific problems—as recommended by Anthony Bryk et al. in *Learning to Improve: How America's Schools Can Get Better at Getting Better* (Cambridge, MA: Harvard Education Press, 2015)—is likely to lead to an agenda that includes improvements in one or more of these practice areas. None of the recommended practice areas entail direct mandates of the details of how teachers should teach in their classrooms. In the past, these mandates have sometimes taken the form of simplified formulas poorly aligned with cognitive science research or with variations in classroom conditions. For examples, see Daisy Christodolou, *Seven Myths About Education* (New York, NY: Routledge, 2014) and Diane Ravitch, *The Death and Life of the Great American School System*, Chapters 3 and 4 (New York, NY: Basic Books, 2010).

[5] High response rates (e.g., 60–70% or more of the individuals chosen to be surveyed fill out the survey) are important in order for district leaders to have confidence in the survey's results. To get higher response rates, it may be helpful to have teachers complete the survey during scheduled meeting times.

The Six Practice Areas in Detail

1. Develop or adopt, refine, and use a written district curriculum that describes what students should learn in each grade/course and subject.

Description

Educators often turn first to state content standards to provide information on what they should teach. But often those standards are missing vital detail about specific content to be learned or how that content might be sequenced.[6] In cases where the state standards documents fall short, district leaders can work with skilled teachers in each grade and subject to develop a district curriculum that supplies what is missing and aligns content across classrooms and grade levels. The curriculum should be developed district-wide so that students who meet requirements for one academic level (elementary or middle school) are adequately prepared for the next level (middle or high school).

A well-designed district curriculum has a number of characteristics. First, it identifies the specific knowledge and skills that students should learn in one grade to be well prepared for content taught in subsequent grades. The curriculum prioritizes the most important topics, facts, and concepts in each subject, and sequences learning so that important prior knowledge is taught before a new topic is introduced.[7] In doing so, the curriculum avoids excessive repetition of topics from year to year. When topics reappear in later grades, they are studied in greater depth to build on what was learned in earlier grades.

A well-designed district curriculum spreads learning out across grade levels so that enough time can be devoted to each topic.[8] For example, one well-known curriculum, the Core Knowledge Sequence, spreads the teaching of US History out over the elementary and middle school grades—by introducing key facts and concepts in the early grades and elaborating on them in later grades—rather than trying to compress the subject into a single survey course in fifth grade followed by another survey course in eighth grade.[9]

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[6] In some cases, state standards are intentionally vague because state policymakers want to leave it up to educators in individual school districts to decide what specific content to teach. To take one example, the Louisiana social studies standards document states, "This document is intended to be used as a blueprint for local curricular decisions. The rigorous framework promotes local flexibility in curricular design, course sequence, assessment methods, and instructional strategies." Accordingly, the document calls for students in kindergarten through fourth grade to understand "that people in different times and places view the world differently," to understand "the causes and nature of various movements of large groups of people into and within (the state) and the United States throughout history," and to learn about the development of democratic principles, as "exemplified by historic figures, events, and symbols." This leaves it up to educators in school districts to spell out which groups, figures, events, and symbols students in each grade should learn about. *Louisiana Content Standards, Benchmarks, and Grade Level Expectations for Social Studies*, www.doa.louisiana.gov/osr/lac/28V121/28v121.pdf, accessed December 17, 2014. For an overview of history standards in multiple states, see Sheldon Stern and Jeremy Stern, *The State of State U.S. History Standards 2011* (Washington, DC: Thomas B. Fordham Institute, February 2011).

[7] For a discussion of the importance of prior knowledge in enabling individuals to make sense of new information, see John Hattie and Gregory Yates, *Visible Learning and the Science of How We Learn*, Chapters 1, 7, 13, 14, and 16 (New York, NY: Routledge, 2014),; and E.D. Hirsch Jr., *The Knowledge Deficit: Closing the Shocking Education Gap for American Children* (New York, NY: Houghton Mifflin, 2006).

[8] For research on the importance of covering topics in sufficient depth in the area of science, see Marc S. Schwartz, Philip M. Sadler, Gerhard Sonnert, and Robert H. Tai, "Depth Versus Breadth: How Content Coverage in High School Science Courses Relates to Later Success in College Science Coursework," *Science Education* 93 (2008): 798–826; Junlei Li, David Klahr, and Stephanie Siler, "What Lies Beneath the Science Achievement Gap: The Challenges of Aligning Science Instruction with Standards and Tests," *Science Educator* 15 (2006): 1–12. Compressing many topics into too short a time is commonly referred to as the problem of "covering the material." In most cases, this compression creates a problem not of giving students *too much* information, but of giving them *too little* information on any one thing.

[9] "The Core Knowledge Sequence," Core Knowledge Foundation, www.coreknowledge.org/sequence, accessed February 21, 2013.

A well-designed district curriculum elaborates and expands on state standards whenever those standards are vague or incomplete. In addition, the curriculum may improve on state standards by taking advantage of connections across subjects. Students are more likely to retain information when what is learned in one subject reinforces what is taught in another.[10] For example, if the students are learning about volcanoes in science, they might read a set of texts about volcanoes in history or language arts and perform computations about volcanic activity in math class.[11]

A well-designed district curriculum addresses the knowledge and skills covered on state tests while minimizing the time teachers spend on explicit test preparation. In general, although it does not leave out content that is due to be tested, the curriculum prioritizes content based on its importance in the overall sequence of P–12 learning, not merely on its importance on a given year's state test.[12]

A well-designed district curriculum may be accompanied by supplemental materials that help teachers plan lessons and illustrate the depth of knowledge that they expect students to attain. (See box, "Supplemental Materials for the District Curriculum.")

Supplemental Materials for the District Curriculum

The purpose of supplemental curriculum materials is to provide useful information to teachers as they plan lessons, assess student learning, and communicate with parents. These materials may include:

- **Pacing guides** indicating the likely amount of time required to teach each topic. These guides should allow enough time for the topic to be taught well in classrooms where unexpected questions or difficulties arise.
- **Model lesson plans** to be used by teachers as idea generators. Ideally, these would consist of lessons than have led to student success in multiple classrooms.
- **Location of readily available instructional materials** that can be used to teach each topic. This can include references to textbook or trade book pages, websites, or kits and other materials maintained by the school or district.
- **Sample student assignments and assessment questions** for each curricular objective. These assessments and assignments should enable students to show their mastery of a given concept in more than one way.
- **Samples of high-quality student work** related to different curricular topics and objectives, along with descriptions of what makes the work of high quality for a student of that grade level. Student work samples can provide examples of students applying the knowledge they have gained. In addition, work samples demonstrating various levels of proficiency can illustrate progress towards producing high-quality work.
- **Information about resources that parents can access** related to specific curricular topics to support their children's learning outside of school.

[10] Studying similar information in different contexts connects the knowledge to a wider variety of associated memories, making recall easier. This is a likely reason why simply varying the learning environment helps students remember new material. (See Benedict Carey, *How We Learn: The Surprising Truth about When, Where, and Why It Happens*, pp. 61–64. New York, NY: Random House, 2014.) In addition, relating new information to content in multiple subjects should help students learn to apply the information in different settings.

[11] Subject-level state standards may not describe how to take advantage of these cross-subject teaching opportunities. The Core Knowledge Sequence (noted earlier) is an example of a curriculum that is coordinated across subjects.

[12] State testing systems generally do not cover all subjects and all important content to be taught in a given year. To allow for this, classroom teachers and school and district leaders may choose to implement a variety of assessments so that the assessments in combination are a better reflection of the priorities in the curriculum. See the third practice area discussed in this report.

Potential Benefits

A well-designed and well-implemented curriculum can have a number of benefits:

Ensuring a coherent sequence of learning across classrooms, grade levels, and schools. The curriculum can help ensure that students who have been enrolled in the district's schools in previous years have been introduced to the prior knowledge needed to understand this year's content.

Improving allocation of time across content topics. A well-designed curriculum can allocate content topics across years in a way that limits the number of topics addressed in a given year and ensures that adequate time is devoted to each topic. The curriculum can help prevent situations where too much time is devoted to some topics that are repeated in grade after grade, while other important content is omitted.

Helping teachers plan lessons and locate suitable materials. The supplemental materials provided with the curriculum can provide examples of lessons that have worked well in other classrooms and save teachers time preparing lessons.

Guiding collaborative conversations among teachers. The curriculum can guide conversations about instructional methods, classroom and homework assignments, and expectations for student learning.

Facilitating the design of local assessments. The curriculum can clarify what is to be learned in specific time periods, making it possible to write assessments that cover precisely that learning. By describing the extent of mastery that is desired and providing examples of high-quality student work, the curriculum's supplemental materials can enable teachers to compare current student work and assessment performance with those standards.

Facilitating communication with parents. The curriculum can help teachers communicate with parents about the learning goals underlying the activities in which their children participate, and ways that they can reinforce those learning goals at home.

Assessing Need

District leaders may choose to prioritize the adoption and refinement of a district curriculum if one or more of the following conditions are true:

- Teachers find that in spite of the guidance provided by state standards, they spend large amounts of time figuring out exactly what to teach. This is a particularly vexing problem for new teachers.
- The lack of a shared curriculum across classrooms makes it difficult for teachers in the same grade and subject to share ideas and lesson plans.
- District leaders find that there is little agreement among teachers of the same grade level in different schools on what constitutes good student work or adequate levels of student mastery on exams.
- Students, parents, and teachers find that academic expectations are misaligned across grade levels, most frequently in the transitions between elementary, middle, and high school. Teachers in the upper grades find that many students lack important prior knowledge and skills to do well in their courses. District leaders find that there is no consensus across the district on when students should be taught the missing knowledge.
- Teachers perceive that they spend too much time trying to find supporting materials for their lessons.

Assessing Implementation

District leaders should monitor their processes for developing and improving the curriculum, and should ascertain whether teachers find it useful in planning lessons, designing classroom assessments, identifying appropriate interventions, and keeping parents informed about what their children are learning. District leaders should also keep track of the extent to which students who master the curriculum in one grade level are well prepared to master what is taught in subsequent grade levels. (See also the section on using data to guide improvements in teaching and learning.)

To assess implementation, district leaders can use district-wide surveys, classroom observations, content reviews by master teachers, and reviews by outside experts to gauge the extent to which the following statements are true:

- The written district curriculum has a grade-by-grade description of specific knowledge, vocabulary, and skills to be learned in every subject and grade or course from preschool through grade 12.
- The district curriculum meets the other criteria of a well-designed curriculum described previously.
- Teachers and school leaders can describe how the content taught in specific grades and courses fits into the overall P–12 sequence of learning; for example, how the content relates to that taught in preceding and subsequent grades.
- The curriculum is used in classrooms across the district.
- As use of the curriculum increases, students have smoother academic transitions from grade to grade and between elementary, middle, and high school.
- As use of the curriculum increases, time spent on narrow test preparation activities decreases.
- Teachers refer to the curriculum when developing lessons in each subject area. Both new and experienced teachers find the curriculum helpful for lesson planning.
- Teachers and school leaders find the curriculum useful for guiding discussions about improving student learning and the quality of teaching.
- Teachers and school leaders use the curriculum to communicate with parents what their children are expected to learn and to inform parents about ways to support their children's learning outside of school.

2. Teach a content-rich curriculum in the early grades.

Description

Many school districts offer a content-rich curriculum in high school with courses in English, mathematics, science, history, geography, civics, literature, the fine arts, foreign languages, and career and technology education. Over the last 30 years, increasing percentages of students have taken these courses, and many states have increased the number of academic courses they require for graduation.[13]

However, inadequate preparation in earlier grades can severely hamper students' ability to master the content of these high-school courses.[14] Students placed in courses for which they are poorly prepared may learn little of the content implied by the course titles, and policies that place students in more advanced courses without addressing their prior preparation may not effectively prepare those students for college and career.[15] In general, students who do not have abundant opportunities to build knowledge and vocabulary in the early grades have great difficulty catching up later.[16]

One approach to improving students' academic preparation is to provide a curriculum in the early grades that is rich in learning about science, history, geography, literature, languages, and the fine arts as well as English language arts and mathematics—a curriculum designed to introduce young students to knowledge about the world. Such a curriculum is likely to be particularly valuable for disadvantaged students who may lack rich learning opportunities outside of school. Especially in the early elementary grades, much of this curriculum can be delivered by reading aloud to children during the English language arts period.[17]

A high-quality, content-rich curriculum systematically builds knowledge about a wide array of academic topics in a way that encourages students to ask questions and to seek to expand their own knowledge.[18] This goes well beyond the quick bursts of information and poorly contextualized lists of facts that an ill-designed curriculum may provide.

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[13] National Center for Education Statistics, *Digest of Education Statistics: 2013*, Table 225.10, "Average number of Carnegie units earned by public high school graduates in various subject fields, by sex and race/ethnicity: Selected years, 1982 through 2009," nces.ed.gov/programs/digest/d13/tables/dt13_225.10.asp; *Achieve, Inc., Closing the Expectations Gap: 2013 Annual Report*, www.achieve.org/files/2013ClosingtheExpectationsGapReport.pdf.

[14] ACT, *The Forgotten Middle: Ensuring that All Students are on Target for College and Career Readiness Before High School* (Iowa City, IA: ACT, 2008); Dina Bassiri, *Research Study: The Forgotten Middle*, (Iowa City, IA: ACT, 2014).

[15] Richard Buddin and Michelle Croft, *Missing the Mark: Students Gain Little from Mandating Additional Mathematics and Science Courses*, (Iowa City, IA: ACT, 2014); Nicholas Montgomery, Elaine Allensworth, and Macarena Correa, *Passing Through Science: The Effects of Raising Graduation Requirements in Science on Course-Taking and Academic Achievement in Chicago* (Consortium on Chicago School Research, 2010); Elaine Allensworth, Takako Nomi, Nicholas Montgomery, and Valerie E. Lee, "College Preparatory Curriculum for All: Academic Consequences of Requiring Algebra and English I for Ninth Graders in Chicago," *Educational Evaluation and Policy Analysis* 31, no. 4, (2009): 367–391; ACT, *Rigor at Risk: Reaffirming Quality in the High School Core Curriculum*, (Iowa City, IA: ACT, 2007); Chrys Dougherty, Lynn Mellor, and Shuling Jian, *Orange Juice or Orange Drink? Ensuring that "Advanced Courses" Live Up to Their Labels*, NCEA Policy Brief No. 1 (Austin, TX: National Center for Educational Accountability, 2006), files.eric.ed.gov/fulltext/ED519415.pdf.

[16] Chrys Dougherty, *Catching Up to College and Career Readiness: The Challenge is Greater for At-Risk Students*, (Iowa City, IA: ACT, 2014); ACT, *Catching Up to College and Career Readiness*, (Iowa City, IA: ACT, 2012), www.act.org/research/policymakers/reports/catchingup.html.

[17] The Listening and Learning strand of the Core Knowledge Language Arts curriculum uses this approach. See www.coreknowledge.org/ckla. Core Knowledge Language Arts also integrates writing, student reading, and other English language arts activities into the process of learning about other subjects. This addresses the issue of how to address reading and writing adequately while teaching content from the other subjects.

[18] For a description of how a well-designed curriculum can encourage the knowledge development process, see Yanqing Sun, Jianwei Zhang, and Marlene Scardamalia, "Knowledge Building and Vocabulary Growth Over Two Years, Grades 3 and 4," *Instructional Science* 38, no. 2 (March 2010), link.springer.com/article/10.1007/s11251-008-9082-5#page-1.

Potential Benefits

Early exposure to knowledge can improve student outcomes in several ways:

Improving students' reading comprehension. Early content learning helps develop students' knowledge and vocabulary, which are vitally important for their ability to comprehend what they read in the upper grades.[19] For example, one study found that kindergarteners' general knowledge of the world was a better predictor of those students' fifth-grade reading ability than were early reading skills.[20] In general, acquired knowledge increases learners' understanding of what well-informed people are talking about.[21] Knowledge and vocabulary develop slowly and cumulatively over time, so students with an early start gain a distinct advantage.[22]

Facilitating learning in depth. Early content learning spreads the acquisition of knowledge over more time, enabling students to explore more topics in greater depth. For example, instead of limiting "World History" to a single high school course, the district curriculum might spread out learning of world history over multiple years, including the elementary grades.[23]

Developing students' curiosity and desire to learn. Early content learning can broaden students' interests and develop their curiosity and desire to learn more. Teaching a content topic in sufficient depth and detail, as is possible when content learning is spread out across more grade levels, makes it easier for teachers to spark students' interest in the topic. Being introduced to a subject can embolden learners to tackle more complex information in the same subject area by enabling them to see the increased complexity as interesting but not overwhelming.[24]

Providing a foundation for students' creativity. Creativity often depends on connecting ideas and information in unexpected ways, and people with larger knowledge bases have access to a greater number of possible connections.[25] The creation of new works and ideas that others will find interesting and valuable also depends on expertise in the area in which the creative production is to occur.[26] Early content learning can begin the process of developing this expertise. Thus, early content learning may contribute to individuals' creativity in later life.

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[19] Hirsch, *The Knowledge Deficit.*

[20] David Grissmer, Kevin J. Grimm, Sophie M. Aiyer, William M. Murrah, and Joel S. Steele, "Fine Motor Skills and Early Comprehension of the World: Two New School Readiness Indictors," *Developmental Psychology* 46, no. 5 (September 2010): 1008–1017.

[21] E.D. Hirsch Jr., *Cultural Literacy: What Every American Needs to Know* (New York, NY: Random House, 1988).

[22] Hirsch, *The Knowledge Deficit.*

[23] For an example, see the Core Knowledge Sequence noted earlier.

[24] This effect was explored in Amanda M. Durik and Kristina L. Matarazzo, "Revved Up or Turned Off? How Domain Knowledge Changes the Relationship between Perceived Task Complexity and Task Interest," *Learning and Individual Differences* 19, no. 1 (2009), 155–159. Acquired knowledge helps convince students that knowledge gaps can be closed with reasonable effort. Learners are motivated to close knowledge gaps but are put off by knowledge chasms—see Hattie and Yates, *Visible Learning*, and Daniel T. Willingham, *Why Don't Students Like School? A Cognitive Scientist Answers Questions about How the Mind Works and What It Means for the Classroom* (San Francisco, CA: Jossey-Bass, 2009). Evidence for the motivational property of acquired knowledge would be cases where experts are more interested in their areas of expertise than are novices, *even when their acquisition of the expertise was extrinsically driven* (e.g., they acquired the expertise in order to increase their earning power). These cases are evidence that knowledge builds interest.

[25] Creative mental connections often consist of analogies. For discussions of the role of analogies in thinking, see Keith Holyoak and Paul Thagard, *Mental Leaps: Analogy in Creative Thought* (Cambridge, MA: MIT Press, 1994; John Pollack, *Shortcut: How Analogies Reveal Connections, Spark Innovation, and Sell Our Greatest Ideas* (New York, NY: Gotham Books, 2014); and Douglas Hofstadter and Emmanuel Sandler, *Surfaces and Essences: Analogies as the Fuel and Fire of Thinking* (New York, NY: Basic Books, 2013).

[26] Keith Sawyer, *Explaining Creativity: The Science of Human Innovation*, 2nd ed. (New York, NY: Oxford University Press, 2012), Chapters 5 and 6.

Assessing Need

District leaders may choose to prioritize teaching a content-rich curriculum in the early grades if one or more of the following conditions are true:

- Many students in the upper grades have trouble with reading comprehension whenever the subject matter and vocabulary depart from what they would be familiar with from personal experience.
- In general, teachers of upper-grades courses are concerned about their students' lack of background knowledge relevant to understanding the course content.
- The content curriculum in the middle and upper grades largely consists of single-year survey courses that seem to crowd too many topics into too little time. Teachers perceive that students could learn the content better if it were spread out over more grade levels.
- Teachers in the early grades (kindergarten through third grade) see an opportunity to develop and broaden students' interests and intellectual curiosity by exposing them to content in science, social studies, and the fine arts.
- Teachers believe that giving students a broad, content-rich curriculum in the elementary grades is an excellent way to prepare them to learn in later years.

Assessing Implementation

District leaders who view content learning in the early grades as essential for preparing students to be good readers and learners in the upper grades should keep track of whether this priority is reflected in the district's curriculum in elementary school classrooms. They should be prepared to discuss the value of a broad, content-rich curriculum in the early grades with students, parents, and community leaders.

To assess implementation, district leaders can use district-wide surveys, school visits, and a review of their own policies and practices to determine the extent to which the following statements are true:

- Students in the early grades receive daily instruction in science and social studies—for example, at least 30–45 minutes in each subject—as well as reading, writing, and mathematics.[27]
- The early-grades science and social studies curricula include student learning about distant places and times as well as lessons drawn from students' immediate surroundings. For example, students in science may learn about the solar system, dinosaurs and other extinct life forms, volcanoes, extreme weather, and ocean life. In social studies, they may learn about early civilizations; cities, states, countries, and continents; and information about other countries.
- District-sponsored professional development for early-grades teachers emphasizes the content areas of science and social studies as well as reading and mathematics.
- District purchases of curriculum materials for the early grades reflect the importance of instruction in all subject areas. Materials are carefully chosen for their alignment with the district curriculum.
- Educators throughout the district are able to explain to parents and community members why "teaching content is teaching reading"[28] and why content learning in the early grades is essential for preparing students to be good readers and content area learners in the upper grades.

[27] The Core Knowledge Language Arts curriculum (noted earlier) shows how to increase the amount of time available for instruction in content subjects by integrating this instruction into the English language arts curriculum.

[28] See "Teaching Content is Teaching Reading" by cognitive scientist Daniel Willingham at www.youtube.com/watch?v=RiP-ijdxqEc.

3. Use data from multiple sources to guide improvements in teaching and learning.

Description

Many school systems collect a variety of data that can be useful for answering questions about student learning, behavior, and engagement. Those data may be categorized into information from assessments of student learning and information from other sources, including student attendance records, grades, discipline reports, classroom observations, transcripts, dropout and graduation data, and surveys of students, teachers, or parents.

Information must not only be collected, but it must be organized and provided to users in a form that is easy to understand and interpret. To accomplish this purpose, districts can develop or purchase an electronic data system with user-friendly reports summarizing the data the district has collected. Small districts may band together and work with an outside agency to develop those reports. These reports should contain information to help users interpret the data: For example, the reports can flag changes that are large enough that they are unlikely to be due to chance or to statistical artifacts such as regression to the mean.[29]

As part of the process of using data, educators at the district, school, and classroom levels need to formulate specific questions about their students' performance and progress in every subject and discuss what data can be used to address these questions.[30]

Potential Benefits

If the right data are readily available and appropriately interpreted, educators and students can realize a variety of benefits:[31]

Improving classroom instruction. Data from short-term assessments can provide timely feedback on student learning, enabling teachers to know when concepts need to be retaught or other changes in instruction may be needed.

Improving interventions for at-risk students. Attendance data can be used to identify students with too many absences so that timely steps can be taken to address the problem. Assessment data can be used to place students in intervention programs and monitor whether those programs are having the desired impact. Data on student grades can be used to identify middle and high school students who are failing their courses and in need of extra help.

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[29] For a discussion of how to distinguish changes over time that are unlikely to be due to chance differences between student cohorts, see Richard Sawyer, "Interpreting Changes Over Time in High School Average ACT® College Readiness Assessment Composite Scores and ACT College Readiness Benchmark Attainment Rates" (ACT Research Report 2013–9). For a discussion of regression to the mean, see Donald T. Campbell and David A. Kenney, *A Primer on Regression Artifacts* (New York, NY: The Guilford Press, 2003). See also the discussion in Chrys Dougherty, Linda Hiserote, and Teresa Shaw, "Catching Up to College and Career Readiness in Kentucky," (ACT Research Report 2014-4), p. 15:

> Because the scores of any predefined group of students contains an error component that is positive on average for students chosen from near the top of the score distribution and negative on average for students chosen from near the bottom, all averages of groups of students *chosen based on their prior performance* tend to move back toward the average of all students. Using a sports analogy, a group of baseball players chosen for the highest batting averages in the first six weeks of the season will probably bat at a lower average for the rest of the season, even if they continue to bat well above the average for all players.

If the school district is large enough to have a research department, an analysis of these issues can be done by individuals in that department. Otherwise, research staff in university departments, state education agencies, or regional education laboratories may be able to help district leaders with the analysis.

[30] Institute of Education Sciences (IES), *Using Student Achievement Data to Support Instructional Decision Making* (Washington, DC: IES, 2009), ies.ed.gov/ncee/wwc/PracticeGuide.aspx?sid=12.

[31] Dougherty, *How School District Leaders Can Support the Use of Data.*

Improving the design of curriculum. Assessment data can provide feedback on whether enough time is allocated to a given content topic to ensure the desired level of student learning. Data can be used to identify where large numbers of students in middle and high school courses show gaps in prerequisite knowledge and skills, indicating the need for increased emphasis on that content in earlier grades.

Improving opportunities for better prepared students. Assessment data can be used to identify students who are prepared for more advanced learning opportunities, such as Advanced Placement and other advanced high school courses. In addition, data from college admissions tests such as the ACT® and SAT can be used to identify underserved students who are good candidates for selective colleges that they might not have considered.

Motivating students and educators. Assessment and behavioral data can be used to set goals for individual students, classrooms, and schools; to monitor whether these goals have been met; and to recognize individual and group success.

Evaluating and improving programs. Survey, classroom observation, and program participation data can be used to identify how well instructional and intervention programs are implemented. Data on student behavior and achievement growth can be used to evaluate the effectiveness of those programs as implemented.

Assessing Need

District leaders may choose to prioritize improving the use of data from multiple sources if one or more of the following conditions are true:

- Many teachers and school leaders perceive that they are "drowning in data" that they have trouble knowing how to interpret.
- Teachers and school leaders have important questions that the currently collected information seems inadequate to address.
- Teachers and school and district leaders spend large amounts of time pulling together information that is available but not organized into readily accessible reports.
- Educators in the district see the need for improving their early warning systems to identify and provide timely assistance to students in all grade levels.
- The student learning data readily available to educators is mostly limited to grades and subjects that are covered on state tests.
- State test data are overemphasized relative to other valuable sources of information about student learning.

Assessing Implementation

District leaders should support the collection and use of assessment and non-assessment data to improve teaching and learning. They should oversee the development of local assessments that address student learning of the district's curriculum; a district data system that provides user-friendly reports from these assessments as well as on student attendance and behavior; and professional development that enables principals and teachers to be adept at interpreting data.

To assess implementation, district leaders can use district-wide surveys, school visits, and a review of their own data systems to determine the extent to which the following statements are true:

- Teachers and leaders in each school work together to identify important questions about student learning and behavior and to describe what information is most useful to addressing each question.
- Teachers and school leaders can identify gaps in the available information and suggest ways to fill the gaps.
- Teachers and school leaders find that when information gaps are identified as important, timely steps are taken to fill the gaps.
- Every school has periodic assessments of student learning shared by all classrooms in each subject and grade.[32] These assessments are closely aligned with the district's curriculum and frequent enough to enable teachers to make timely adjustments to help their current students.
- Data are stored electronically and used to produce reports that teachers and school leaders use to make instructional and administrative decisions. Collecting the data and producing and interpreting the reports do not place a time burden on educators that outweighs the reports' perceived benefits.
- Teachers and school leaders find that their colleagues are increasingly well-prepared to use and interpret the available data.

4. Encourage teachers to collaborate routinely around curriculum, instruction, and assessment.

Description

Teachers can learn from each other if they have time to work together. To ensure time for collaboration, district leaders can ensure that schools' master schedules give teachers in every grade and subject time to meet at least weekly to discuss teaching and learning in their classrooms. To ensure that collaboration is productive, district leaders can encourage school leadership teams to promote an environment of trust so that teachers feel comfortable seeking advice from their colleagues.

As part of their routine responsibilities as collaborative team members, teachers can share materials and instructional strategies; develop, review, and refine lessons; and study student work samples and assessment results. They can observe instruction in each other's classrooms and discuss with their colleagues how well the lessons worked. District leaders can establish the expectation that these collaborative activities are a routine part of teachers' professional work, just as medical specialists in a teaching hospital collaborate in making decisions on how best to treat patients.[33]

[32] These common assessments can be developed either district-wide or on a school-by-school basis. Whichever is the case, district leaders who specialize in curriculum, instruction, and assessment should ensure that the assessments are well aligned with the content and academic achievement standards described in the district's written curriculum. For examples of how educators use data from these assessments, see Chrys Dougherty, "Use of Data to Support Teaching and Learning: A Case Study of Two School Districts" (ACT Research Report 2015-1).

[33] ACT, *Rising to the Challenge of College and Career Readiness*, p. 6.

Potential Benefits

Encouraging teacher collaboration can have several benefits that help teachers have a greater impact with students:

Improving teachers' ability to learn from experience. Research on the relationship between experience and teacher effectiveness has found that teachers' performance often levels off after only two or three years in the classroom.[34] Participating in collaborative problem-solving teams can help teachers extend this period of improvement.[35]

Improving the skill development of new teachers. Collaborative teacher teams can assist with mentoring new teachers.

Improving lesson planning and delivery. Teachers can benefit from their colleagues' assistance in developing lessons and sharing supporting materials. They can discuss ways to make content interesting and to encourage student curiosity. Teachers observing each other's lessons can provide helpful feedback.

Improving teachers' interpretation and use of data. Teachers can learn from their peers about how to interpret and use data, particularly if at least one teacher on each team acquires expertise in this area.

Improving teacher motivation and retention. The ability to work with colleagues can help teachers feel supported and encouraged in their work and increase their success with students, thus improving teachers' morale and reducing teacher turnover. This can be particularly important in schools serving at-risk student populations.

Assessing Need

District leaders may choose to prioritize supporting teacher collaboration if one or more of the following conditions are true:

- Teachers report that they have little time during the working week to meet and share ideas with colleagues.
- Teachers report that they do nearly all lesson planning by themselves with little input or feedback from colleagues.
- Teachers report that they have few conversations with colleagues about how their lessons went and about what they could do better to work with particular students.
- Teachers rarely visit each other's classrooms to observe lessons and provide feedback.
- Teachers rarely discuss curriculum, teaching, and assessment with colleagues in other grade levels or subject areas.
- Teachers rarely discuss curriculum, teaching, and assessment ideas with colleagues in other schools.

[34] See, for example, Steven Rivkin, Eric Hanushek, and John Kain, "Teachers, Schools, and Academic Achievement," *Econometrica* 73, no. 2 (March 2005), pp. 417–458; and Steven Cantrell, "Pay and Performance: The Utility of Teacher Experience, Education, Credentials, and Attendance," Los Angeles Unified School District unpublished report, 2003, notebook.lausd.net/pls/ptl/docs/page/ca_lausd/fldr_organizations/fldr_plcy_res_dev/par_division_main/research_unit/publications/reports/pau%20pay%20%26%20perform.pdf.

[35] Matthew Kraft and John P. Papay, "Can Professional Environments in Schools Promote Teacher Development? Explaining Heterogeneity in Returns to Teaching Experience," *Educational Evaluation and Policy Analysis* 36, no. 4 (December 2014), pp. 476–500.

Assessing Implementation

To promote effective teacher collaboration, district leaders need to ensure that teachers in every grade, subject, and school have adequate common planning time during the week and opportunities to observe each other's classrooms. In addition, district leaders should schedule periodic meetings between teachers of the same subject in different schools. District policies and funding and staffing priorities must support this arrangement.

To assess implementation, district leaders can use school visits and district-wide surveys of teachers and school leaders to determine the extent to which the following statements are true:

- Teachers meet at least weekly to discuss what their students are learning, where students are experiencing difficulties, and what they can do to help.
- Teachers regularly observe each other's lessons and offer feedback.
- Teachers report that they collaborate with colleagues in planning lessons and developing supporting materials.
- Teachers report that they are comfortable sharing their teaching experiences, evidence of student learning, and ideas for improvement with their colleagues.
- Teachers meet periodically with teachers of the same subject and grade level from other schools in the district. For example, third-grade teachers from different schools might meet to discuss how they teach social studies in their classrooms.[36]
- Teachers meet periodically with teachers of the same subject across grade levels. For example, elementary, middle, and high school science teachers might meet to discuss how better to prepare students in elementary and middle school to succeed in high school science courses.
- Over time, diagnostic evaluations of student behaviors and academic outcomes indicate that teachers are having more success with students.

5. Develop a coaching system for teachers.

Description

Coaching is often provided where people believe that results really matter—for example, in competitive sports. Others can benefit from coaching as well. For example, one skilled surgeon with experience of thousands of surgeries was able to describe how coaching from another skilled practitioner was able to improve the details of his performance.[37]

For improving day-to-day instruction, coaching that provides personal feedback to teachers is likely to be a superior alternative to single-day professional development sessions. Those sessions may be effective at transmitting knowledge to teachers, but less so at enabling them to apply that knowledge in the classroom.[38]

Although some coaching can be provided by a principal who is a skilled instructional leader, principals have many competing demands on their time. Recognizing this problem, some school districts hire instructional coaches who make periodic visits to teachers' classrooms, observing an entire class period of instruction and providing the teacher with feedback on areas of strength and suggestions for improvement.

[36] Leaders of small districts with only one school at a given level may want to work cooperatively with neighboring districts so that, for example, elementary science teachers can meet with their counterparts from nearby districts.

[37] Atul Gawande, "Personal Best: Top Athletes and Singers Have Coaches. Should You?" (*The New Yorker*, October 3, 2011).

[38] Jim Knight, *Instructional Coaching: A Partnership Approach to Improving Instruction* (Thousand Oaks, CA: Corwin Press, 2007).

District leaders developing a coaching program will usually need to start the program relatively small and expand it over several years as they gain experience identifying and hiring individuals who are skilled at evaluating instruction and at developing the right collaborative relationships with teachers.[39] Typically, instructional coaches are drawn from the ranks of skilled and experienced teachers. To the extent that principals are involved in coaching, district leaders must pay close attention to their skills in this area. As they develop and expand the program, district leaders must also identify which grade levels, subject areas, and schools have first priority when coaching resources are limited.

Teachers may at the outset view coaching as suited mainly for beginning or remedial learners. Telling an individual that "You can really benefit from coaching" is commonly taken as a criticism of his or her performance, whereas this statement is likely to be true for *any* professional, even the most skilled, as long as the coach is also a knowledgeable professional.[40] Just as teacher collaboration depends on developing a relationship of trust among teachers, effective coaching depends on a relationship of trust between teacher and coach. Coaches must typically spend time listening to teachers one-on-one in order to build these relationships. Once these relationships are built, coaches can also facilitate collaboration among teachers.

Potential Benefits

The benefits from coaching overlap with those from teacher collaboration:

Improving teachers' ability to learn from deliberate practice. Individuals learning a new set of skills often improve quickly in their first few months or years, then reach a plateau, settling on routines and habits with which they are comfortable. Beyond this point, improvement is likely to occur not from sheer repetition, but from deliberate practice: discovering ways that one's methods can be improved, and systematically practicing the improvement.[41] This is usually difficult to do without feedback from a skilled observer. If these ways to improve were obvious to the practitioner without this feedback, he or she would probably have made them earlier.[42]

Accelerating the skill development of new teachers. Instructional coaches can pay special attention to developing new teachers' skills in the classroom.

Assisting teachers with specific instructional strategies. Instructional coaches can help teachers work on specific teaching methods, such as when and how to differentiate instruction for students.

Facilitating the implementation of curriculum and instructional programs. Instructional coaches can help teachers adapt their lessons when state standards or district curriculum changes or the district adopts a new instructional program.

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[39] Jim Knight, *Instructional Coaching*.

[40] Gawande, "Personal Best," describes how after benefitting from coaching, he shared his experience with fellow surgeons:

> "Oh, I can think of a few people who could use some coaching," has been a common reaction. Not many say, "Man, could I use a coach!" Once, I wouldn't have, either.

Yet Gawande points out that top performing athletes and singers often hire coaches, even when they do not belong to organizations such as sports teams that automatically provide coaching. Those top performers realize that if they stop improving, they will not achieve their professional goals.

[41] K. Anders Ericsson, "Deliberate Practice and Acquisition of Expert Performance: A General Overview," *Academic Emergency Medicine* 15, no. 11 (November 2008), 988–94; Ericsson, "The Influence of Experience and Deliberate Practice on the Development of Superior Expert Performance," *The Cambridge Handbook of Expertise and Expert Performance*, 685–705 (New York, NY: Cambridge University Press, 2006); Robert Marzano, "Art & Science of Teaching: What Teachers Gain from Deliberate Practice," *Educational Leadership* 68, no. 4 (December 2010/January 2011), 82–85.

[42] Andrew Rotherham and Daniel T. Willingham, "21st-Century Skills: The Challenges Ahead," *Educational Leadership* 67, no. 1 (September 2009), 16–21.

Improving teacher motivation and retention. As is the case with teacher collaboration, personal attention and advice from an instructional coach can help teachers feel supported and encouraged in their work and increase their success with students, thus improving teachers' morale and reducing teacher turnover.

Assessing Need

District leaders may choose to prioritize developing an instructional coaching program if one or more of the following conditions are true:

- Many teachers indicate a desire for more personal feedback on their teaching.
- School leaders report that given their other job responsibilities, they lack time to give teachers the desired amount of feedback, or they lack expertise to give feedback in specific content areas.
- Teachers and school leaders find that existing models of professional development are insufficient to help teachers adjust to new standards, programs, and student needs.
- Teachers find the knowledge gained from existing professional development programs is difficult to apply on a day-to-day basis in the classroom.

Assessing Implementation

District leaders must understand that the development of an effective coaching system in their district is a multi-year process. They must work with school board members and community leaders to ensure that the school district budget adequately supports the development of such a system. District leaders must promote the idea that coaching is for all professionals, not just for those in special need of assistance.

To assess implementation, district leaders can use school visits and district-wide surveys of teachers and school leaders to determine the extent to which the following statements are true:

- Every teacher in the grades, subjects, and schools targeted for instructional coaching is provided with sufficiently frequent and detailed feedback on his or her teaching.
- Teachers of all experience levels regularly seek out their instructional coaches for ideas and assistance.
- Teachers recognize the value of coaching and deliberate practice and believe that being coached for improvement is part of their professional responsibility. They do not believe that coaching is mostly for inexperienced or low-performing teachers.
- Over time, diagnostic evaluations of student behaviors and academic outcomes indicate that teachers are having more success with students.

6. Communicate with parents about their children's academic progress and what their children are expected to learn.

Description

Parents and teachers are often described as partners in students' education, but good partnerships require good communication. Teachers often use report card grades to inform parents on whether their children are meeting expectations. However, to put that information in context, parents need to know what those expectations are.

A well-designed district curriculum describes learning expectations, and a well-designed set of assessments keeps teachers informed about the progress each student is making. Reports to parents on student learning can be expanded to communicate what students are expected to learn and how different levels of student performance (e.g., outstanding, satisfactory, needs improvement, unsatisfactory) are defined.[43]

District leaders can work with school leaders and classroom teachers to develop ways to get information about curriculum to parents. For example, district leaders can post the curriculum online. District and school leaders and classroom teachers can collaborate to create a monthly newsletter for each grade that lets parents know what their children will learn in the coming weeks. The newsletter and online curriculum can also provide suggestions for how parents can help their children with learning outside of school.

Parents can also get some idea of what their children are expected to learn by examining their children's homework assignments. Thus, one means of improving communication with parents is to create homework assignments designed to have parents review curricular content with students.[44]

In addition, it is important that parents be contacted quickly when their students experience difficulties (e.g., they miss school, are absent from or chronically late to a particular class, have behavior problems, or require additional assistance in learning academic content).[45]

Potential Benefits

Helping parents understand better what their children are learning and how well they are doing in school can have a number of benefits:

Improving parent-student conversations. When parents know more about what their children are supposed to be learning, they can ask them more specific questions about what they have learned in school.

Improving student motivation. When parents show awareness of what students are supposed to be learning, this can increase students' motivation to learn.

Improving students' completion of homework assignments. Increasing parents' awareness of what their children are learning and how well they are doing may also increase their diligence in monitoring their children's completion of homework assignments.

[43] For an example, see Garden Grove (CA) Unified School District, "What Every Parent Needs to Know: Standards-Based Report Cards, Second Grade" www2.ggusd.us/parentresources/upload/202-2ndgrparenthandbookerev.1106.pdf.

[44] For examples of these materials, see the Purdue University Scientific Literacy Project, www.purduescientificliteracyproject.org/FamilyLiteracy/tabid/136/Default.aspx.

[45] To the extent that information on attendance, discipline, and academic learning are routinely input into the district's data system, that system can be set to flag instances where parents need to be notified. See Dougherty, *Use of Data to Support Teaching and Learning*.

Improving parents' responsiveness to students' difficulties. Parents who are accustomed to receiving routine communication from the school—including information on when their student does well—may be more likely to be responsive to communications about their students' academic or behavioral difficulties.

Assessing Need

District leaders may choose to prioritize improving communication with parents if one or more of the following conditions are true:

- Most teacher communication with parents is about behavioral issues.
- Teachers and school leaders report that parents seem to be slow to notice or react when their children miss school or fall behind academically.
- Teachers report that many students do not turn in their homework.
- When parents do get involved, they ask questions about why students are learning particular content and the purpose of classroom or homework assignments.
- Teachers believe that parents need a better understanding of ways they can help their children succeed.
- Teachers and school leaders hope to encourage parents to talk to their children about what they are learning in school and the courses that their middle- and high-schoolers need to take.

Assessing Implementation

District leaders must work with teachers and school leaders at each level (elementary, middle, and high school) to develop multiple ways of communicating learning expectations to parents. They should look for evidence that parents find the information helpful and easy to understand and that they know what actions they can take in response.

To assess implementation, district leaders can use data from district-wide surveys of teachers, school leaders, parents, and students and from the district's electronic data system to determine the extent to which the following statements are true:

- Teachers, school leaders, and parents believe that the systems used to communicate routinely with parents are effective at increasing parents' information about and involvement in their children's education; all three groups believe that the time devoted to these communications is manageable.
- Teachers, school leaders, and parents believe that communications with parents about students' academic and behavioral difficulties are sufficiently timely and are successful at getting parents' and students' attention and helping them address the problem.
- Efforts to improve routine communication with parents are associated with higher rates of students completing and turning in homework assignments.
- High school students report on surveys that they discuss their courses and academic and career goals with their parents.
- Efforts to improve communication with parents about students' academic and behavioral difficulties are associated with improved outcomes related to the problem being targeted (e.g., improved school attendance, fewer behavioral difficulties, increased attendance at after-school tutoring programs, and improved performance on the school's or district's curriculum-based assessment).

Conclusion

In this report, we discussed the importance of six key practice areas and ways to monitor implementation of practices in those areas. To promote the long-term improvement of educational practices, district leaders should:

- develop a long-term improvement strategy based on identifying key practice areas—such as the ones identified in this report—and monitoring progress in implementing practices in those areas
- develop a balanced system of data indicators that includes evidence of their school system's progress in four areas: academic performance; student behaviors, attitudes, and school climate; implementation of key practices; and changes in community environmental factors that support or impede learning
- monitor the association between success in implementing key practices and improvement in student academic and behavioral outcomes
- keep school board members and community leaders informed about progress on all four types of indicators
- be prepared to discuss how school board members and community leaders can support the district's long-term improvement strategy

For their part, school board members and community leaders should:

- encourage district leaders to develop and sustain a long-term strategy to improve key educational practices—a strategy that will last through changes in district leadership; support changes and initiatives that are well aligned with this strategy
- review information from available indicators of academic performance, student attitudes and behavior, educator practices, and the community environment when participating in discussions about district priorities; work with district leaders on ways to fill in missing information
- show interest in evidence that educators' implementation of key practices is improving and that those practices are having a positive impact on student outcomes; show interest in long-term improvement trends, not just this year's change from last year
- oppose efforts to inflate performance on key indicators—such as scores on state-mandated tests—by using strategies such as narrowing the curriculum that do not support the district's long-term improvement goals

A long-term commitment to improving key practices in the district—and to pass these improvements along as new teachers and administrators are hired—is vital to creating lasting district-wide improvement in student outcomes. ■

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