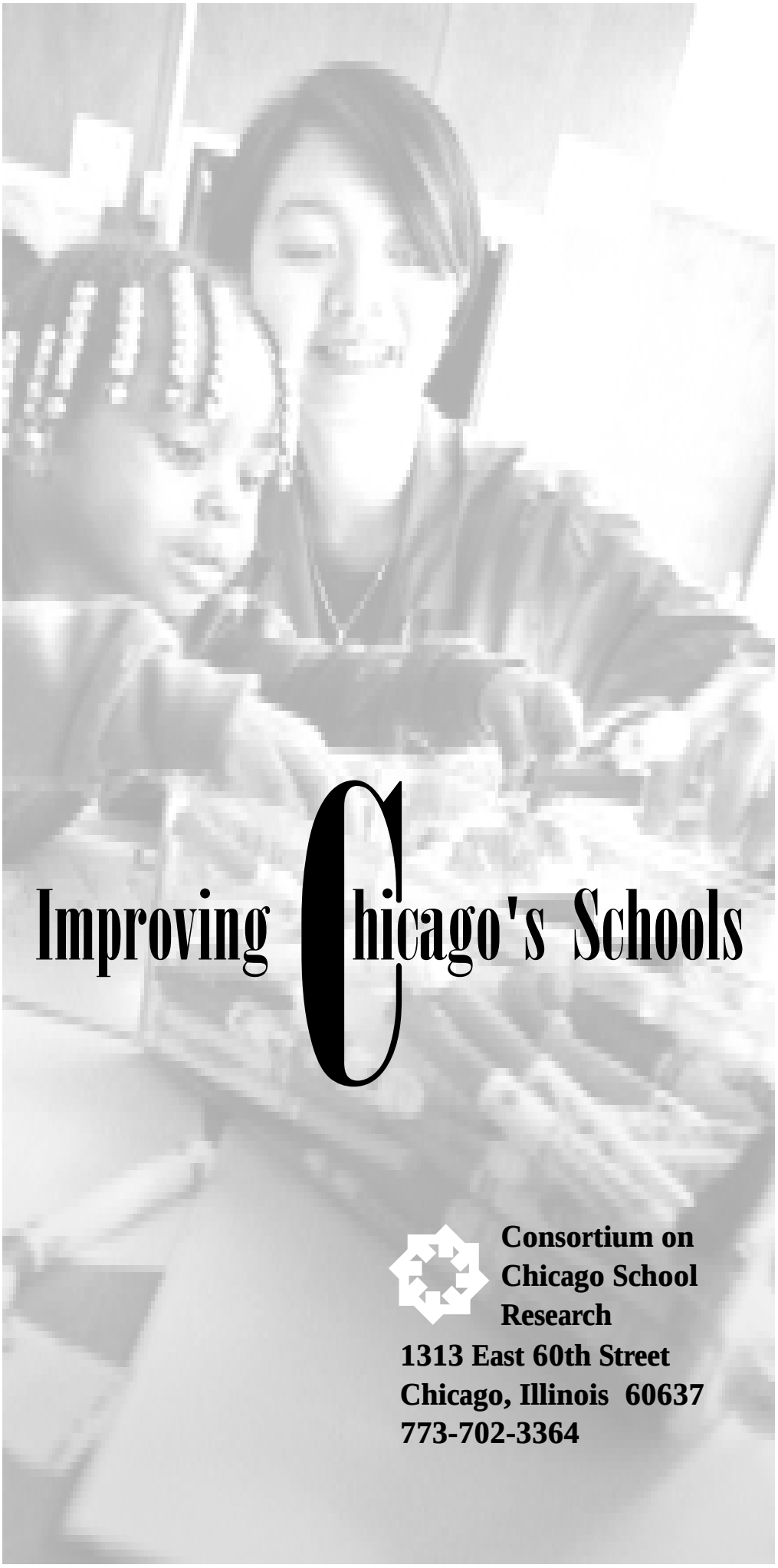

Setting the Pace:

Opportunities to Learn in Chicago's Elementary Schools

Improving Chicago's Schools

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November 1998

Six Reasons Why Instruction Slows Down

Our study of schools and classrooms taught us that many factors contribute to slow pacing. Some factors are organizational, such as very weak grade to grade information about what is actually being taught and learned. Indeed, we were regularly queried about such things by teachers during our school visits. "What are they teaching down there in those other grades?"

Other factors are human. Practices and habits that contribute to slow pacing are rational and well intentioned, but they accumulate into patterns that steadily erode learning opportunities. Below we outline six of the most pervasive factors suggested by observations and interviews with teachers. We offer these factors to foster understanding and to encourage reflective discussion and action.

1. **Review and repetition.** Starter segments that review prerequisite knowledge and skills are a time-tested method for introducing new material. For example, when we observed lessons about parallelograms, teachers began by reviewing definitions of polygons and parallel lines. But when review segments last longer than the segments focused on new material and skills, as we often observed, instructional programs acquire a "two steps back, one step forward" rate of progress. Teachers' decisions to review material frequently stem from the best intentions, such as a desire to present material in a clear, step-by-step process. As more than one teacher sternly reminded us, "People say that repetition is bad, but sometimes it isn't. I think the kids do better when they repeat things." Indeed, many teachers we observed and interviewed believed that slower pacing and repetition helped their students to learn. But how often this repetition and review occurs needs to be examined and reconsidered. We find no connection between slow pacing and improved student learning, a finding echoed in the recent Third International Math and Science Study (TIMSS).[1] All we can say with the evidence at hand is that steady exposure to slow pacing leaves Chicago's students farther and farther behind.

Some repetitions more understandably reflect the fact that certain topics and skills have no obvious or fixed place in the curriculum. An example from our observations was teaching the eight parts of speech. It is common to introduce middle grade students to the eight parts of speech, but many high school language arts textbooks cover them also. All of us forget what the eight parts of speech are (you can test yourself). But there is an important difference between being reminded of them and spending whole lessons writing up their definitions. Forgetting that pronouns are one of the eight parts of speech may not mean that one doesn't know what a pronoun is or how to use it. But many teachers we observed and interviewed either feared this to be the case or believed it wiser to hedge their bets through thorough reteaching.[2]

2. **Grades and test preparation.** Ironically, and painfully for thousands of teachers, the demands for improved grade and test outcomes seem to slow instruction. As the end of each quarter approaches, teachers are increasingly tempted to assign familiar, easy to complete tasks to help their students earn points and avoid a failing grade. Time spent in these familiar tasks limits time spent exploring new material and developing new skills.

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[1]William H. Schmidt, Curtis C. McKnight, Pamela M. Jakwerth, Leland S. Cogan, Senta A. Raizen, Richard T. Houang, Gilbert A. Valverde, David E. Wiley, Richard G. Wolfe, Leonard G. Bianchi, Wen-Ling Yang, Seung-Ho Kang, and Edward D. Britton, *Facing the Consequences: Using TIMSS for a Closer Look at United States Mathematics and Science Education* (Boston: Kluwer Academic Publishing, 1998).

[2]To ease your minds, the eight parts of speech are noun, pronoun, verb, adverb, adjective, article, conjunction, and interjection.

The most predictable and extensive instructional slowdown occurs during the spring, as teachers stop introducing new material to review and practice for the state-mandated achievement tests and the Iowa Tests of Basic Skills. During the first year of our field studies (1994), this review typically began in March. In each successive year that we visited schools, this "test prep season" began earlier and lasted longer.[3]

3. **Weak homework norms.** A great deal of practice and review occurs in classrooms because it does not occur at home. Homework is a source of instructional time and contributes to instructional pacing for the simple reason that it extends opportunity to learn beyond the school day. Furthermore, the common practice of beginning homework in class also slows instruction by absorbing time when teachers and students could work together on new material.

4. **Student resistance.** Students can slow instruction when they resist difficult or unfamiliar material. We observed students telling teachers that they had never been taught a particular topic when we had, in fact, observed teachers in earlier grades doing so. How often do teachers hear their students protest, "This is too hard!" or "We don't know how to do this" before stopping to reteach former topics or to provide students with opportunities to do well by giving them familiar tasks? On any given day it may feel wiser or safer to review and practice old content, postponing new work for another day when it seems easier to push forward.

5. **Battered faith.** The constantly shifting priorities and mandates of school and district leaders have eroded many teachers' faith that it is worthwhile to assume the difficult task of raising and standardizing their expectations through formal and informal collaboration. As one teacher confessed in utter frustration: "I have been asked to write a different curriculum every year, with a different set of teachers, and a different theory of reading. This year, all they care about is the test; all the other work we did last year doesn't matter any more. Why should I exhaust myself working for new goals when they will be changed before we even get there?"

6. **Low expectations.** In its plainest form, pacing reflects how much teachers aim to accomplish on a daily basis. Teachers who allow blocks of time to go unused cannot make the same progress as those who are more vigilant about getting started and getting engaged. Similarly, teachers who set out to accomplish more during their lessons typically do so. A second-grade class that takes 45 minutes to review seven words from the story of the Ugly Duckling does not accomplish as much as a class that reviews these words in 15 minutes and then builds them into some sentences they write together.

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[3]BetsAnn Smith, It's about Time: School Development and Achievement in Chicago's Elementary Schools (Chicago: Consortium on Chicago School Research, 1998).

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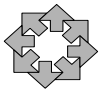

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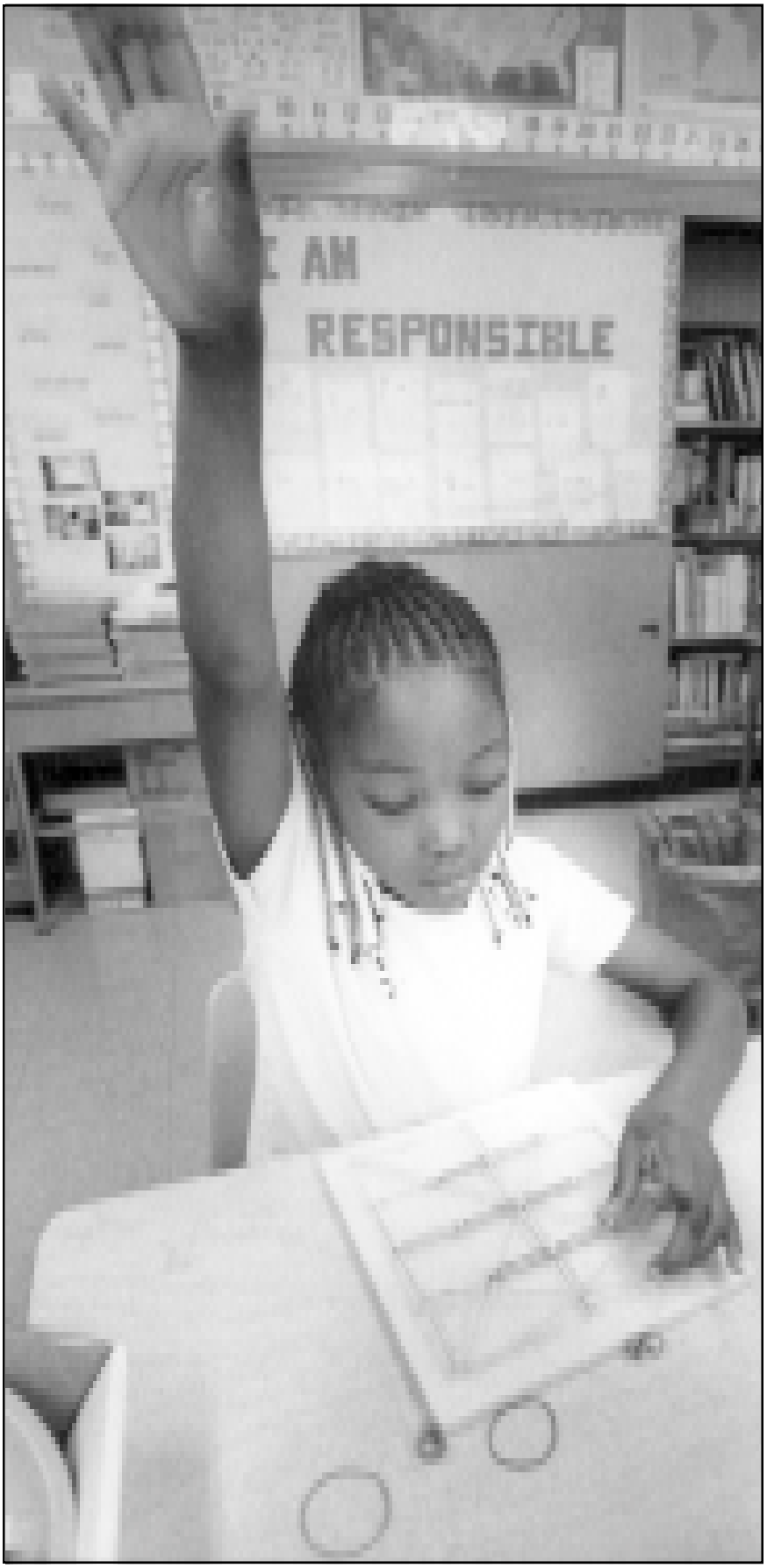
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RESPONSIBLE

Introduction

Nineteen ninety-eight completes an important decade of the Chicago Public Schools' (CPS) evolving reform movement. The Consortium on Chicago School Research has contributed to this process through a series of reports on school improvement and student learning. In this study, we turn our attention to one of the most essential concerns of all: the quality of classroom instruction.

At issue here is a critical concern—the opportunities for Chicago's children to learn all that is expected of them. We find that while some Chicago Public Schools (CPS) students experience instruction that keeps pace with grade level expectations and test demands, many do not. Moreover, while some Chicago teachers are working to align their instructional programs across classrooms and grades, others operate under widely different assumptions about what students should know and be able to do. Especially troublesome is the finding that students attending schools in Chicago's most disadvantaged neighborhoods are much more likely to encounter instruction that is poorly coordinated and that conveys weak expectations for student learning.

Fortunately, there is also good news in this report. We find that some Chicago schools—including some that serve disadvantaged neighborhoods—present their students with a progression of challenging instructional opportunities. In these schools, administrators and teachers are working together to coordinate instructional programs that keep pace with nationally normed expectations for student achievement. Some of the distinctive characteristics of these schools are also identified in this study.

Acknowledgments

Our study of classroom instruction involved many researchers, but is particularly indebted to Eric Camburn, JoAn Chun, Karen DeMoss, Russ Donofry, Gudelia Lopez, and Lisa Scruggs. It also involved the professional cooperation of hundreds of Chicago Public Schools teachers. We appreciate and applaud their willingness to forgo the privacy of their classrooms and to share their insights and experiences.

We would also like to acknowledge the contributions of Benjamin D. Wright, John M. Linacre, and Stuart Luppescu in guiding the development of the content pacing scale. This work is linked to earlier research by Stuart Luppescu on equating multiple forms of the Iowa Tests of Basic Skills used by the Chicago Public Schools. We continue to be indebted to both the leadership of the school system and the staff of the Office of Accountability for access to data and advice and assistance in its proper use. The CPS also facilitated the collection of the survey data used in this study.

We are grateful for the editorial and production expertise of Consortium staff: Kay Kersch Kirkpatrick, Sandra Jennings, and Rebecca Williams. The Consortium's directors and the Steering Committee read and reread this report, and we thank them for their comments.

This report represents a culmination and synthesis of multiple lines of research that have been ongoing for several years. This would not have been possible without the sustained financial support for this work from The MacArthur Foundation, The Joyce Foundation, and The Spencer Foundation. Some of the early classroom observation research also was supported by the Illinois State Board of Education. We would like to thank Al Ramirez, former deputy superintendent, and Connie Wise, Division Administrator of Research and Policy Development, for their assistance.

We hope this research will inform public understanding and discussion of the challenges teachers face and the supports they need to reach the student learning goals set by the Illinois State Board of Education. Most important, we hope this research helps to improve the learning opportunities and achievements of Chicago's students.

A Visit to Some Chicago Classrooms

Imagine yourself in the hallway of a Chicago public school. Pausing outside a classroom door, you hear a teacher begin a math lesson by saying, "Today we are going to study parallelograms. A parallelogram is one example of a polygon with parallel sides." Without looking into the room to see the age of the students, what grade level would you guess is being taught? Second grade? Fifth grade? Eighth grade? Possibly even tenth grade? If you answered any or all of the above, you were correct. During our observations of math instruction in Chicago, we observed students in all the above grades presented with introductory lessons on the parallelogram. Each class began with either the teacher or a student reading the definition of a polygon and a parallelogram from a math textbook. All of the classes then discussed the requirement that parallelograms have parallel lines. The second-grade students went on to draw and measure the perimeter of parallelograms using a ruler. In all the other grades, teachers and students spent the rest of class learning to measure the angles inside a parallelogram.

When we began observing classes across primary, middle, and high school grades, we did not set out to record and chart students' exposure to topic and skill sequences. As we observed more and more classes, however, we became increasingly concerned. We were most troubled when we saw very similar lessons taught to students several grades apart, as in the parallelogram example above, or the day when two researchers at the same school emerged from primary and middle school classrooms to find that they had observed comparable lessons on how to write a paragraph. In response to numerous experiences like this, we began investigating how curriculum content progresses from grade to grade in the Chicago Public Schools.

We recognize the need to be careful in our judgments of these observations. Many topics and skills can and should be revisited across students' school careers. Parallelograms can be studied in simple or complex ways, and writing paragraphs can always be improved. But we did not observe such continuous development and refinement of learned concepts and content. These were not cases of teachers choosing to explore a few topics in depth rather than many topics superficially. Rather, the same topics and skills were being taught again and again, with little to no development in their content, depth, or complexity.

About Our Survey and Observation Data

The Consortium on Chicago School Research conducted a broad-based survey of Chicago Public Schools elementary and high school teachers and students in 1994. These surveys covered a wide range of topics, including local school governance, school climate, opportunities for professional development and work conditions of teachers, and the dynamics of instruction and classroom life.[1] Teachers at each grade also responded to survey items concerning either reading or mathematics instruction in their classrooms. In the full survey, there were 6,264 teachers from 384 schools. The analyses in this study use information from 2,036 teachers in these schools who were full-time classroom teachers and who responded to the mathematics portion of the questionnaire. While the full sample of teachers was used to generate school information on professional community, only the mathematics teacher responses were used in content pacing analyses.

On average, 12 teachers per school responded to questions about mathematics instruction, with a fairly even distribution of grades taught throughout. Most of the teachers who responded to this portion of the survey were female (84 percent), a portion entirely consistent with the gender distribution of the elementary teachers in the city schools as a whole (85 percent female). In addition, 45 percent of the teachers identified themselves as white, 40 percent as African-American, and 10 percent as Latino/Hispanic, with the remaining 5 percent as Asian-American or "other." Finally, about 45 percent of the teachers surveyed reported holding a master's degree or more.

These survey analyses are complemented by classroom case studies that provide more in-depth understanding of instruction in the schools. From spring 1994 through spring 1996, a team of researchers observed over 800 language arts and mathematics classes in eight Chicago public elementary schools and seven high schools. Our sample of schools reflects the most common student and community characteristics of the Chicago Public Schools.

The observational data in this report reflect the general instructional programs in the CPS. We did not observe lessons in magnet programs, honors programs, or remedial and special education classes. We observed language arts and mathematics instruction in grades two, five, eight, nine, and ten, keeping detailed logs of teaching and learning activities.

Roughly half of the teachers we observed were new or mid-career teachers who had taught between one and nine years. The other half were veteran teachers who had taught for ten or more years. The racial distribution of the observed teachers was similar to that of the district's teacher force, but included slightly more white teachers and slightly fewer African-American teachers. Nearly all of the 250 teachers observed participated in one or more in-depth interviews about their teaching practices and programs. Observing instruction directly and talking with teachers personally provided data and insights that strengthened our findings and enriched our understanding.

All schools and teachers participated in the studies voluntarily. We aimed to record and understand rather than critique their work. This positive approach did not obscure the serious problems and challenges of the general instructional programs of the schools.

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[1]Consistent with the general philosophy of the Consortium as a public informing organization, all data collected by the Consortium are made available to the public, subject only to concerns about preserving the confidentiality of respondents. To access the data used in this study, see Bilcer, Luppescu, Sebring, and Thum (1996). Contact the Consortium via the World Wide Web at **http://www.consortium-chicago.org.**

Consider, for example, the observation logs of a set of CPS language arts classes that we visited (see Figure 1). These classes focused on literary concepts such as a story's setting, main character, and main events. We recorded dozens and dozens of classes and assignments devoted to these topics. In many respects, these lessons were entirely appropriate. Knowledge of literary concepts is clearly stated as a learning goal for CPS students, and a review of basic story elements is a natural opening to all kinds of literary discussions. But we frequently observed high school students spending as much time defining and identifying these basic concepts as their elementary counterparts (see, for example, the left column in Figure 1), rather than simply noting them for context and moving on to explore more advanced literary concepts such as dialogue, figurative speech, hyperbole, satire, symbolism, or personification (see the right column in Figure 1).

These contrasting examples point to key problems in the organization of instruction in the Chicago Public Schools. The students who experienced classes like those described in the right-hand column were exposed to more literary concepts and skills than those who took the classes described in the left column. In the most basic sense, then, these students had more opportunities to learn because they were required to explore more disciplinary content. Beyond this, the extra topics and skills studied were valuable because they built on students' prior knowledge and made progressively greater intellectual demands of them. As a result, these students' opportunities to learn were enhanced both by the fact that the instruction was more strongly

Figure 1

Observations of Chicago Classrooms
Teaching Literary Terms

	Slow Pacing/ Constant Reteaching	**vs.**	**Pacing Aimed at Student Development**
	Students begin with appropriate lessons, but the concepts used to study and understand new literature do not build on prior knowledge as students progress through the middle grades and high school.		**New and increasingly sophisticated literary concepts are steadily added to students' exploration of literature as they advance through the middle grades and high school.**
Grade 2	Read *The Mitten*. Identify and record the title, author, setting, and main characters. Review the story and record events from the beginning, middle, and end of the story.		Identify the sequence of events in a story by looking for time-order words such as "first," "next," "then," or "the next day." Summarize the stories according to their main events.
Grade 5	Read *Philip Hall Likes Me, I Reckon, Maybe*. Do bulletin board reports describing the theme, main character, and setting of the story.		Read *The King Who Rained*. Pay attention to its use of idioms. List these idioms and write down what you think they mean.
Grade 8	Read *And Now Miguel*. Who is the narrator? What is the setting?		Select a novel to read and write about. Make note of its use of hyperbole. List some examples. How does hyperbole help us to write creatively?
Grade 9	Name some of the main characters of *To Kill a Mockingbird*. Where does the story take place? Who is your favorite character? Write one paragraph explaining why.		Select one Greek myth and analyze it according to dimensions such as its hero, the call, the quest, the journey, helpers and guides, and transformation.
Grade 10	Read *Miss Cynthie*. Who is the narrator? What is the setting? Describe Miss Cynthie in three sentences. Describe David in three sentences.		Select one African fable and chart it according to the components of a traditional plot line. Discuss its use of the following: protagonists, antagonists, conflict, foreshadowing, flashback, and irony.

The Instructional Depth vs. Coverage Debate

The topic of instructional pacing can easily raise confusion and criticism. Cross-national analyses of curriculum have criticized United States schools for excessive concern about covering an extensive array of content at the expense of in-depth student work on specific content.[1] To be clear, the phenomenon we are observing in Chicago is not that of teachers taking time to engage their students in in-depth studies of a smaller number of key disciplinary concepts. In fact, over 80 percent of the lessons we observed during our field studies were rated as having little to no depth or complexity in the information transmitted or in the understanding students demonstrated.[2] In truth, our observations and analysis suggest that the "depth versus coverage" debate does not often apply to instruction in Chicago classrooms. Our data indicate that neither occurs with much frequency. The pacing lag we identify seems an outcome of heavy topic review and repetition unaccompanied by any increase in instructional depth.

Our concern is not that instruction be mindlessly speeded up or that more is necessarily better. Instead, we believe that students should experience a sequence of instruction that exposes them in a systematic and developmentally challenging fashion to the content on which they are tested.

The Chicago case we illustrate here may well be an acute example of problems associated with mathematics programs in other urban school systems and, indeed, the country as a whole. In the most recent report of the Third International Math and Science Study, U.S. math classrooms were notable for the limited amount of time they gave to introducing new material to their students (about 10 minutes per math lesson) and a persistent focus on basic skills. To quote from the report, "U.S. mathematics instruction was centered on computation and homework. It focused comparatively less on new instruction and more on review. These practices are consistent with a view of school mathematics as made up of discrete bits, to be mastered cumulatively and incrementally, for which constant review is necessary..."[3]

The importance of more in-depth learning opportunities in the Chicago Public Schools is a serious concern. We examine this aspect of instruction in a companion study, titled *The Quality of Intellectual Work in Chicago Schools: A Baseline Report*.[4]

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[1]See, for example, studies by Stevenson and Stigler (1992) and Schmidt et al. (1998) for TIMSS curriculum analysis reporting.

[2]Ratings of in-depth learning were made using rubrics developed at the Center on Organization and Restructuring of Schools by Newmann and Wehlage (1995).

[3]See Schmidt et al. (1998), p. 19.

[4]See Newmann, Lopez, and Bryk (1998).

paced and because lessons were more thoughtfully developed over time.

Figure 2, which documents how a fifth-grade and a tenth-grade class explored a novel, offers another view of these problems. We observed both classes reading high quality, grade appropriate works of literature: *Charlotte's Web* in the fifth grade, *Bless Me, Ultima* in the tenth. In this sense, we could say that everyone was working at grade level. But the assignments given to the tenth-grade students were so much like those asked of the fifth graders that the older students' opportunity to learn was greatly minimized. Both classes spent most of their lesson time reading the novels aloud in class and answering basic comprehension questions posed by their teacher: "What was the rat's response to Charlotte's question?" "What did the grandmother hang over the doorway?" Both classes had a theme, selected by the teacher, that was traced through the chapters. And both classes of students were given several weeks to write one draft of a short report related to this theme. While these assignments seemed reasonably challenging for fifth-grade students, they do not come close to meeting standards for high school learning and achievement. For example, tenth-grade students should read more at home. They should move beyond the basic facts of their novel to interpret the author's purpose and message and to discuss their own thoughts on the story. We also expected significant differences in the writing assignments given to students and the standards used to assess them.

The examples in Figures 1 and 2 are from language arts lessons, but we could also illustrate these points with data from the math classes we visited (see *Repeat Offenders* sidebar). Many of the lessons we observed reflected confused or dampened expectations for student learning. Indeed, some lessons completely defied expectations when, for example, elementary lessons were more demanding than some of the middle grade and high school lessons we saw. As our observations of these phenomena accumulated, we began to question what was actually guiding teachers' instructional practice. When, for example, are students expected to know and use the literary concept of a story's setting without further instruction? It became clear that, in at least some of the schools we studied, faculty members lacked a shared conception of the instructional program overall, and of their own particular set of responsibilities for advancing it.

Figure 2

Reading and Exploring a Novel
Literature Progresses, but Intellectual Activities Do Not

Fifth Grade: ***Charlotte's Web***	Tenth Grade***: Bless Me, Ultima***
· Students read much of the book aloud in class. · Students take short tests and quizzes with *who*, *what*, and *where* questions to review the facts of the story. · The teacher selects the theme of friendship as a focus of discussion and writing. · Students write a short essay on friendship. They write one draft only.	· Students read much of the book aloud in class. · Students take short tests and quizzes with *who*, *what*, and *where* questions to review the facts of the story. · The teacher selects the theme of superstition as a focus of discussion and writing. · Students write a short essay about superstition. They write one draft only.

Repeat Offenders

Some topics and learning goals seem to have a clear time and place in the schools' instructional program. For example, we consistently observed capitalization taught in the second grade, the metric system in the eighth grade, and *Romeo and Juliet* in the ninth. But many other topics do not appear to have a clear time and place. Below are some of the subjects and skills we saw repeated or stretched out across as many as five different grades.

Language Arts

Understanding fiction versus nonfiction
Identifying and defining setting, main character, and main events
How to create a story board
How to write a formal letter
The eight parts of speech
How to use the comma
How to write a summary paragraph
The structure of a five-paragraph essay
How to write a footnote or bibliography

Additionally, many language arts activities that necessarily repeat do not necessarily develop. The most common examples observed were class presentations, three-minute speeches, summarizing a book by making a book jacket, and writing a book report. The expectations and standards applied to these products do not systematically rise as students move through middle and high school grades.

Math

Money problems
Parallel and perpendicular lines
Place value, 1-1000
Decimals
Area and perimeter of polygons and triangles
Long division
Fractions, proportion, and percent
How to use a number line
Right angles
Radius, diameter, and circumference

Both Math and Language Arts

How to read, create, and color bar graphs and pie charts
How to read street maps and transportation schedules

Instructional Opportunities to Learn

Our in-depth field studies raised critical concerns about how some Chicago schools organize and pace instruction and how this structure affects students' opportunities to learn. Now, we turn to a system-level analysis of these issues. While we could not create a systemwide database of direct classroom observations, we were able to gather survey reports from Chicago Public Schools teachers of the content they taught their students. These data allowed us to investigate the prevalence of the problems identified in the field work and how they were distributed among the diverse school communities that comprise the CPS.

Put simply, we wanted our analysis to inform us whether Chicago students are given the opportunity to learn all of the content for which they are held accountable. We focused our inquiry on mathematics because math instruction is more commonly approached as a systematic presentation of topics that build upon prior knowledge and that grow in complexity.[1] Accordingly, it was easier to develop reliable survey items that ask teachers to report their math content emphases for each elementary grade level.

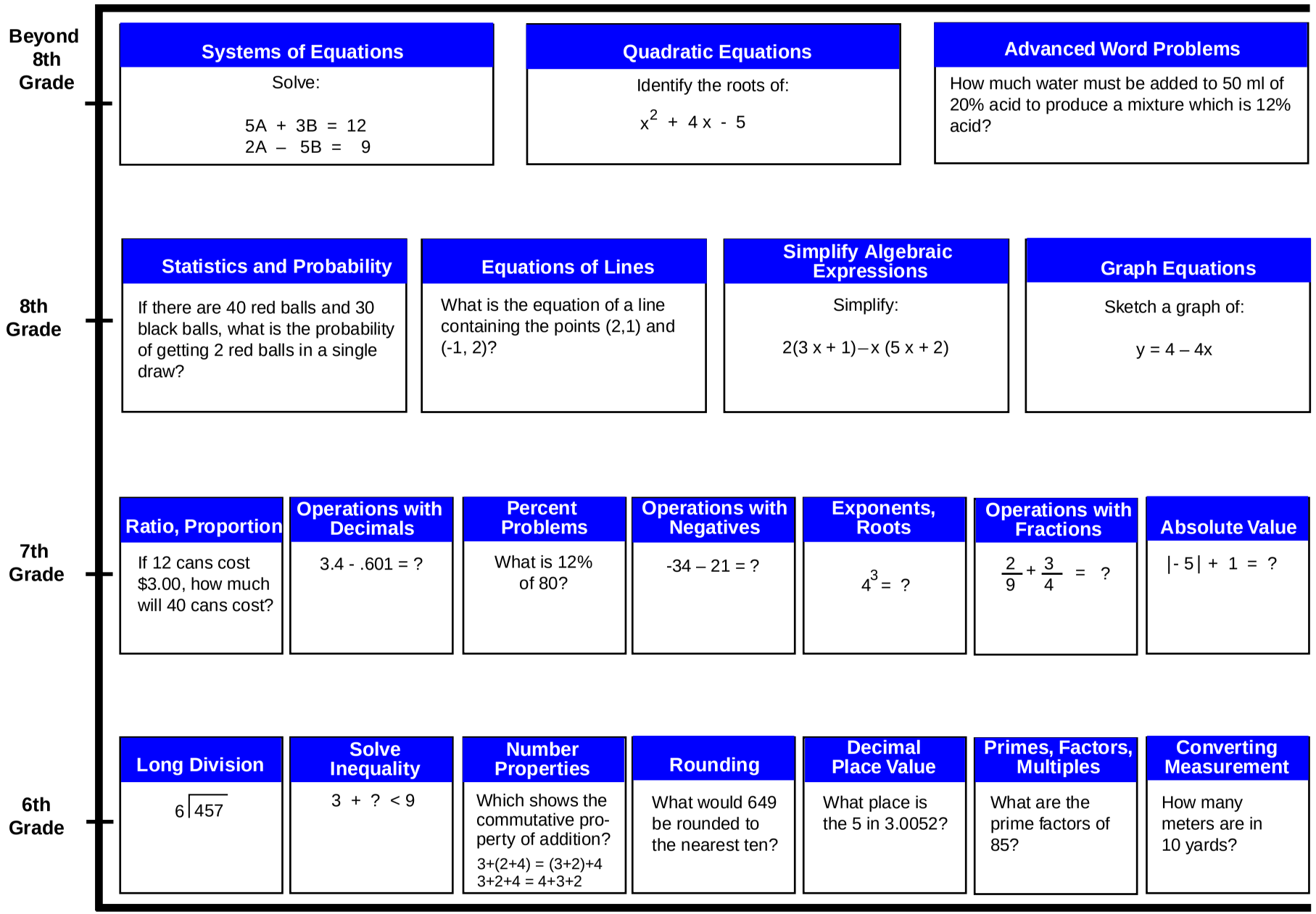
We organized this research around the de facto math standards of the CPS—the subject matter content of the Iowa Tests of Basic Skills (ITBS). The ITBS has been used by the CPS as a measure of student achievement for more than two decades but has taken on heightened prominence in the last few years. Student performance on these tests is now the primary information base for an increasingly high-stakes student accountability system. Among other uses, students' test results are now used to mandate summer school attendance, to deny grade promotions, and to delay entry into the city's regular high schools.

Before we analyzed teacher surveys, however, it was necessary to conduct an extensive content analysis of the actual math items in the ITBS.[2] Each test item or question was grouped into one of 48 categories. These categories sort test items according to both mathematic concepts (e.g., addition, geometric congruence, ratio) and overall difficulty (difficulty levels reflect the percent of students at a given grade level able to answer an item correctly).[3] Though individual items associated with different mathematic

Grade Level Mastery Ruler in the Iowa Tests of Basic Skills

Figure 3

Iowa Tests of Basic Skills items reprinted with permission from Riverside Publishing



Note: All of these are multiple choice questions in which the student is asked to identify the correct answer from four possibilities given. Because of space limitations, we present only the questions.

5th Grade

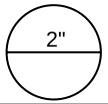
Sizes of Fractions
What portion is shaded?

Solve for One Unknown
2 (? + 4) = 10

Approximation
What number is the closest to the sum of 298 and 3004?

3200 3300

Area, Volume
What is the area of the circle



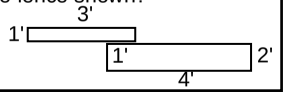
Multi-digit Multiplication
32 x 45 = ?

4th Grade

Simple Division
25 ÷ 5 = ?

Place Value and Regrouping
By how much will the value of the number change if the 4 is changed to a 5 in 742?

Finding Length, Perimeter
How long is the perimeter of the fence shown?



Shifting Between Words and Numbers
How do you write 2,340 in words?

Word Problems with Multiplication, Division
If one pencil costs 15 cents, how many can you buy for $3.00?

3rd Grade

Multi-digit Addition
43
+ 19
?

Multiplication Facts
What is 3 x 5?

Multi-digit Subtraction
67
- 8
?

Measuring Common Objects
How tall is the door?

Counting by n >1
Fill in the missing number

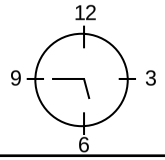
3, 6, ? , 12

Converting Units of Time
How many seconds are in 2 and a half hours?

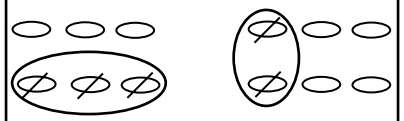
2nd Grade

Coins, Value of Money
Jan has 3 quarters and 2 dimes. How much money is that?

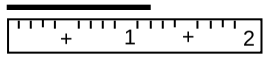
Telling Time
What time is shown?



Using Models for Operations
What picture shows that half of 6 is 3?

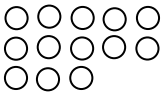


Using Number Lines and Rulers
Use the ruler to find the length of the line.

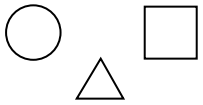


1st Grade

Counting Objects
(spoken)
How many?



Identify Shapes
Which is a circle?



Name, Order Numbers
(spoken)

Which number is eighteen?

8 81 18

Simple Addition
(spoken)

What is 4 + 4?

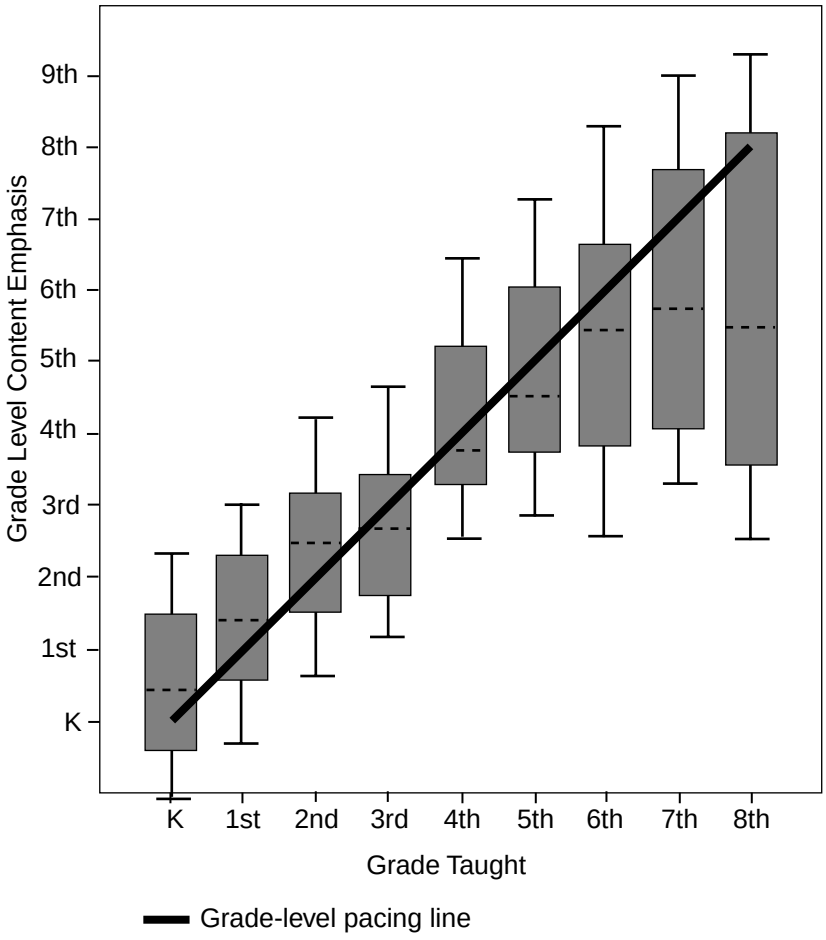
Simple Subtraction
8 - 6 = ?

Identify Operations
What sign tells you to subtract?

Word Problems w/Add, Subtract
Rick had 9 cookies and ate 3. How many did he have left?

Pacing of Math Curriculum Slows Down in Upper Grades

Figure 4



Note: The grade-level pacing line indicates that content coverage is keeping pace with grade level learning, based on equating teachers' reports of content coverage with the Iowa Tests of Basic Skills.

How to Read a Box Plot
Each box encloses the middle 50 percent of the teachers' responses. The broken line inside the box is the median; half of the schools are above this line, half are below. The lines extending up and down from the box, called "whiskers," show the top and bottom 25 percent of the teacher content coverage reports.

concepts can overlap in their level of difficulty, the elementary math content of the ITBS generally arranges itself in a progression of concepts that build on one another and grow in difficulty. Figure 3 lays out this sequencing of item content by difficulty. The ruler is anchored in national math norms at each grade level and identifies the concepts and skills that students are expected to master year by year. These math norms are based on actual test results from a national sample of students. Notice that the bottom end of the scale assesses mastery over relatively simple mathematics concepts of "counting objects," "simple addition," and "telling time." In the mid-range, a student performing on level for fifth grade, for example, should show competence with such skills as "sizes of fractions," "area, volume," and "multi-digit multiplication." (This student should also demonstrate competence in the simple skills that appear below fifth grade on the ruler, such as "simple division.") At the very top of the scale, beyond eighth grade, are algebraic items that assess mastery over such topics as "systems of equations" and "quadratic equations."

Overall, the math ruler provides a general picture of the grade-to-grade organization of instruction assumed in the ITBS. These are the de facto standards against which CPS students are being judged by the accountability system.

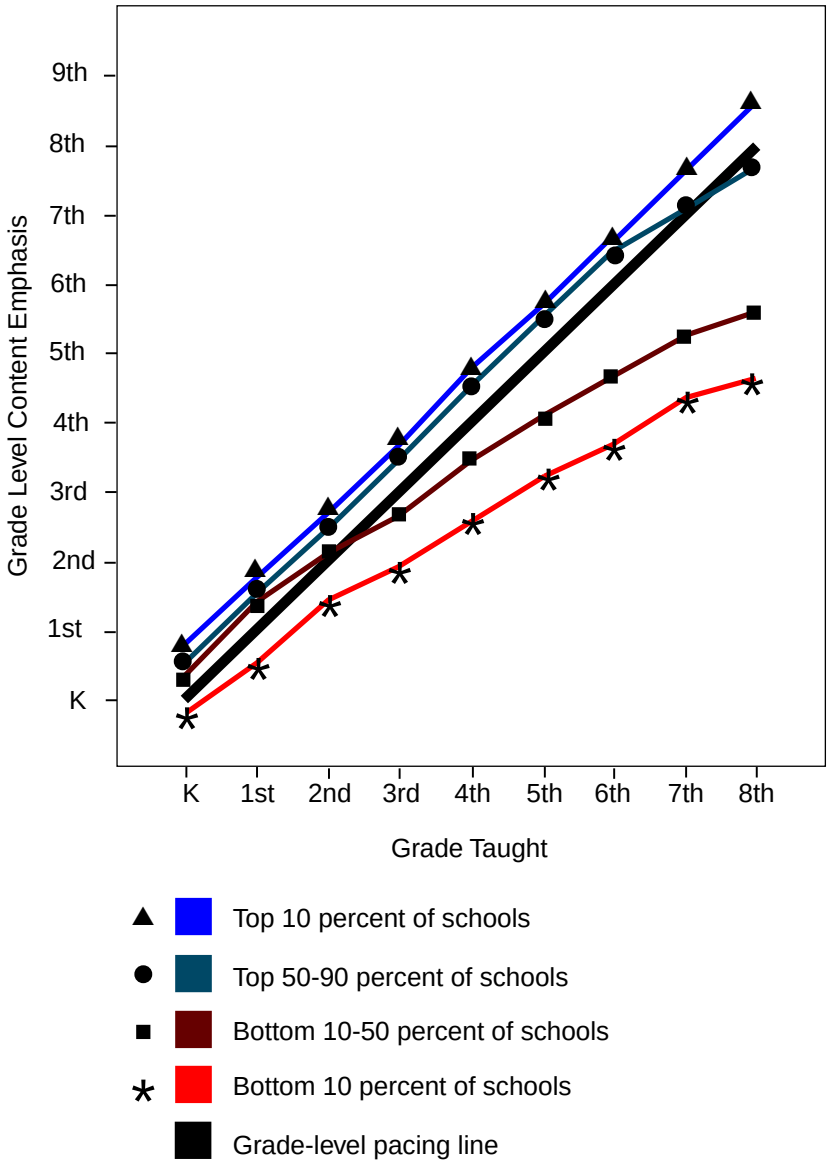
Next we turned to elementary school teacher survey reports to examine whether students actually have the opportunity to learn this content. Specifically, elementary teachers were

asked to indicate the grade level of their class, the particular math content covered that year, and the relative amount of time spent on each content area. Using these data, we were able to create a scale of content taught, comparable to the ITBS measurement ruler in Figure 3. This allowed us to directly compare the content coverage by Chicago teachers with the content students are actually tested on by the ITBS.[4] This comparison, in turn, enabled us to assess whether Chicago students are afforded an adequate opportunity to learn the material for which they are now held accountable.

The dark black line in Figure 4 identifies the results expected if teachers' content emphases align with ITBS grade level mastery.[5] In other words, the line represents math content that we should expect teachers to teach if students are being given the opportunity to learn what is being tested on the ITBS. The box plots indicate the range of content emphases actually reported by Chicago teachers at each grade level. At second grade, for example, more than half of the teachers indicate content coverage consistent with (or above) grade level mastery (that is, their content emphases score at or above the heavy black line). About a quarter of those teachers report instruction well above grade level, moving into the third to fourth grade mastery range. In contrast, three-quarters of the teachers at eighth grade report content emphases below the grade level line, with the bottom quarter of eighth-grade teachers indicating a content focus equivalent to about grade three.

Figure 5

About Half of CPS Schools Maintain Grade-Level Pacing; the Other Half Fall Far Behind

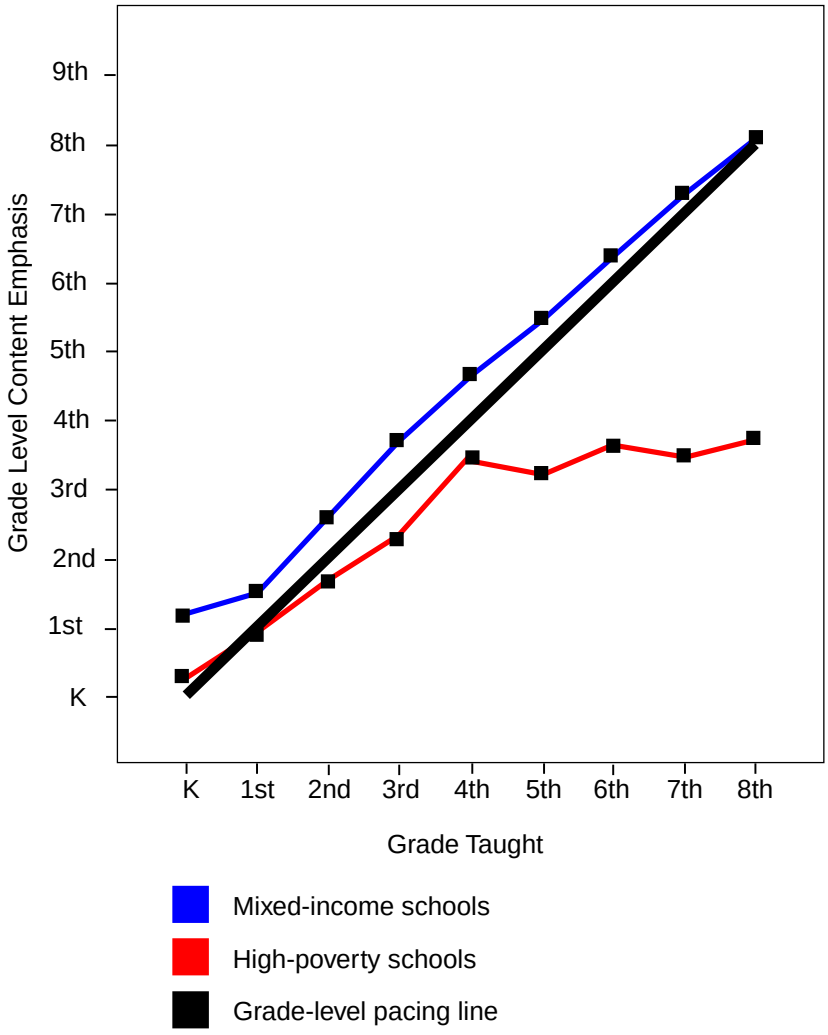


The most immediate impression here is that teachers' own accounts validate our classroom observations. Teachers are reporting in our surveys wide variability in students' exposure to subject matter and frequent repetition of topics across one or more years. While some classrooms are working on content consistent with student achievement at or above national norms, the vast majority are not.

We have used the teacher survey reports on content emphases to formulate two key indicators of each school's organization of instruction.

Pacing Slows Down Dramatically in High-Poverty Schools

Figure 6



Note: These two groups represent the highest and lowest quartiles in terms of percent low-income enrollment in the CPS. The **mixed-income schools** have less than 50 percent poverty. **High-poverty schools** enroll greater than 90 percent low-income students.

One indicator examines the rate at which teachers in a school introduce new and more difficult subject matter to their students. We call this indicator *instructional pacing*. Instructional pacing is key to understanding whether topics are being introduced at a rate consistent with the demands and expectations of the ITBS. Second, we look at the coordination of instructional content within each school grade, which we call *grade-level coherence*. Is there, for example, a distinctive fifth-grade curriculum, or does each fifth-grade teacher "do her own thing"? Both good instructional pacing and grade-level coherence are necessary to provide students with the opportunities to learn what the ITBS tests.

Instructional Pacing

By combining the survey responses of mathematics teachers within a school, we can compute an instructional pacing trajectory for that school.[6] Figure 5 illustrates the range of pacing within the Chicago school system. We see that in most Chicago elementary schools, kindergarten teachers report instructional emphasis consistent with or above ITBS norms. Moreover, between kindergarten and second grade, teachers in most schools continue to report a steady introduction of new topics (as evidenced by the steady climb of their pacing lines), keeping close to or exceeding the ITBS expectations.

Content coverage starts to differentiate at third grade. The mathematics content tested on the ITBS continues to advance, yet the pacing of roughly half of Chicago's schools begins to flatten out and fall seriously behind. Indeed, many schools at or above ITBS expectations in primary school are almost a year behind by the fourth grade. By eighth grade, many schools continue to teach material from the primary and middle grades curriculum. Indeed, less than 50 percent of Chicago's schools keep pace with the ITBS during the last three years of elementary schooling.

Unfortunately, we do not have the same kind of data for the high school TAP test as we do the ITBS, so we cannot continue this graph through the upper grades. But our field observations of hundreds of high school math lessons provide considerable evidence that this pacing lag continues through high school, seriously diminishing students' math achievement and their preparation for higher education.

Effects of basic school characteristics. Our concern that all students be provided opportunities to learn the content on which they are tested led us to investigate whether certain types of Chicago schools are more prone than others to slow pacing. We examined the effects that a variety of school and community characteristics might have on the pace of instruction. These factors include the prior achievement levels of the school, racial composition, percent low-income enrollment, school size, and rates of student mobility. Not surprisingly, we found that curriculum pacing was positively related to the school's achievement history. Many selective academic magnet schools, for example, have pacing trajectories well above the ITBS national norm reference line.

More telling is what we find after taking prior achievement into account. Even when we control for prior achievement, the percent of low-income students enrolled in a school influences instructional pacing.[7] To illustrate this effect, Figure 6 compares instructional pacing trajectories from high-poverty schools (where more than 90 percent of the student body comes from low-income families) with more mixed-income schools (where less than 50 percent of the student body comes from low-income families). Chicago students who attend schools with high concentrations of poverty experience slower instructional pacing that basically flattens out around fourth grade. While this repetition may help reinforce primary skills, it also limits students' exposure to new topics, including topics on which they

Figure 7

Pacing Is Fastest in Integrated Schools and Slowest in Predominately Minority and African-American Schools

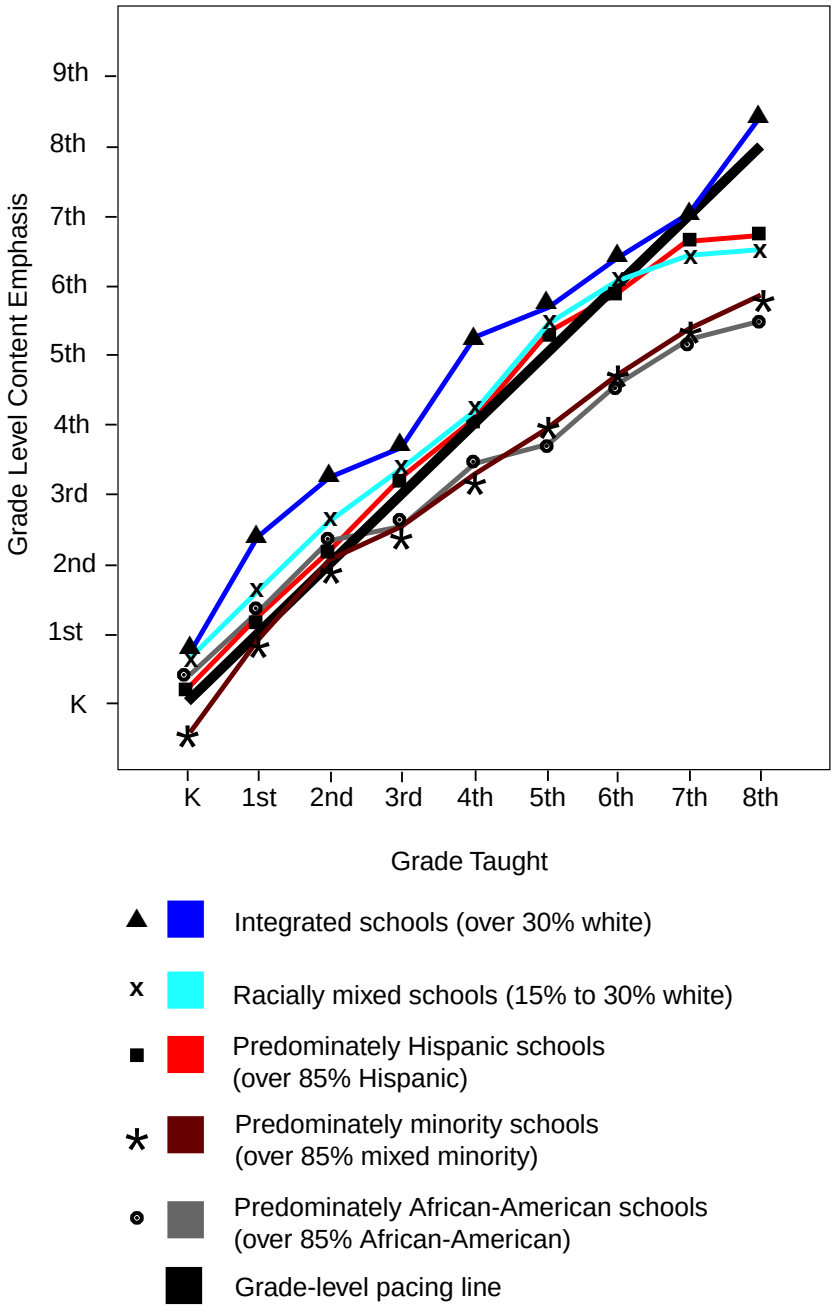
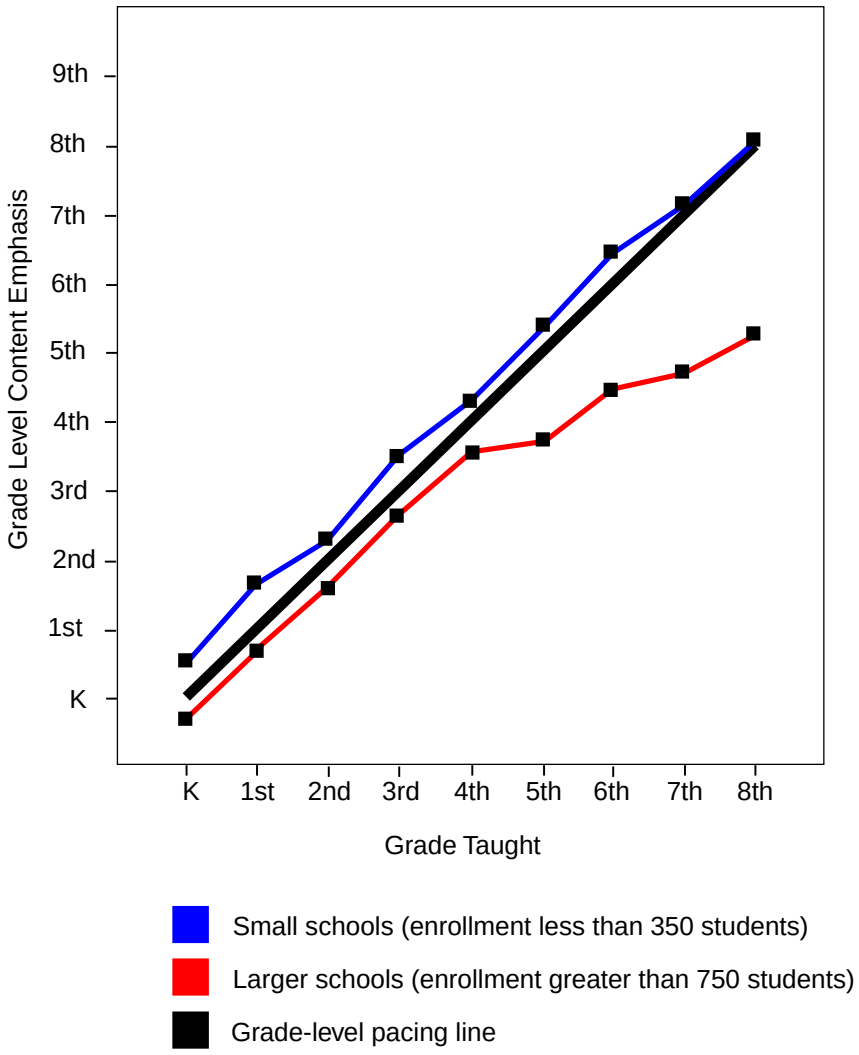


Figure 8

Small Schools Are More Likely To Keep Pace



will be tested. Other inquiries into school life suggest that slow pacing may also leave students unmotivated and resentful toward school.[8] And, as mentioned, our observations found no evidence that slower pacing was contributing to more in-depth teaching and learning. The classroom life of these students appears to consist of repetitive cycles of basic skills instruction.

In contrast to what we found in predominately high-poverty schools, students in schools with mixed-income populations typically follow a math curriculum that keeps pace with the ITBS. Students in these schools are introduced to significantly more topics and skills in each grade than are the students in high-poverty schools. The pattern becomes apparent between fourth and fifth grade, and the gap grows larger with each successive year.

Equally troubling are the relationships between pacing and the racial composition of the school (see Figure 7). Though the pattern varies some from grade to grade, integrated schools are the most likely to keep pace with ITBS norms, followed by Chicago's racially mixed schools and predominately Hispanic elementary schools. Predominately minority and African-American schools are the most likely to suffer slow pacing that lags behind ITBS demands.[9] These findings echo the results of other Consortium studies, which have suggested that many of Chicago's most racially isolated schools, especially its African-American schools, have been left behind by reform. These schools continue to face a very steep climb to national norms.[10]

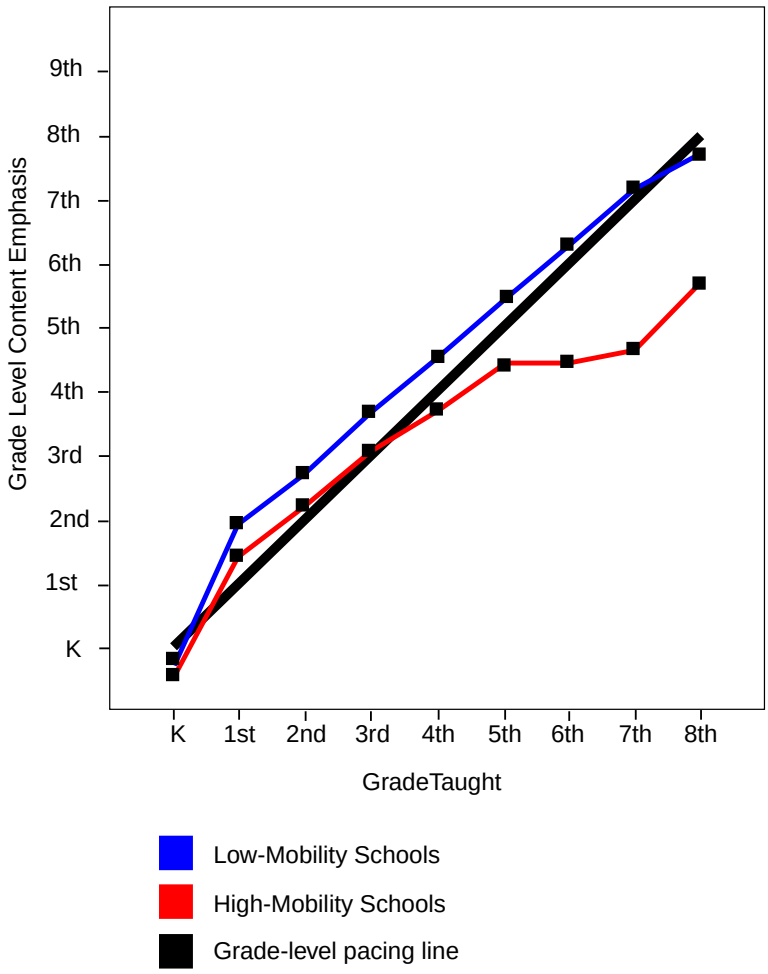
The evidence in Figures 6 and 7 implies that students' social background has a great deal to do with how much material they are given and expected to learn. This gap between what is taught to students from different family and community backgrounds reveals major differences in students' opportunities to learn within the Chicago Public Schools. This finding is cause for serious concern. A significant body of research has demonstrated that access and exposure to math content has clear and predictable effects on the achievement of students. Regardless of family and community background, students who are exposed to more math content and an overall richer math curriculum have higher levels of math achievement than peers whose learning opportunities are more limited.[11]

More troubling still, we find that such students are further disadvan-

taged by other organizational characteristics common to their schools. For example, Chicago's high-poverty schools tend to be larger, with more students in each grade level. The average school enrollment in a CPS elementary school serving a more than 90 percent low-income student body is 676 students. In contrast, schools serving a mixed-income student body have an average enrollment of 435 students. High-poverty schools also have much higher levels of student mobility (34 percent) than mixed income schools (10 percent). Our analyses show that both of these factors—school size and the level of student mobility in and out of schools—are also associated with instructional pacing (see Figures 8 and 9 respectively). That is, even after we control for the effects of prior academic achievement and student poverty, we still find significantly stronger pacing in smaller schools and in schools with lower levels of student mobility. These findings illustrate how family and community poverty interact with aspects of the school organization to limit student learning opportunities.

Figure 9

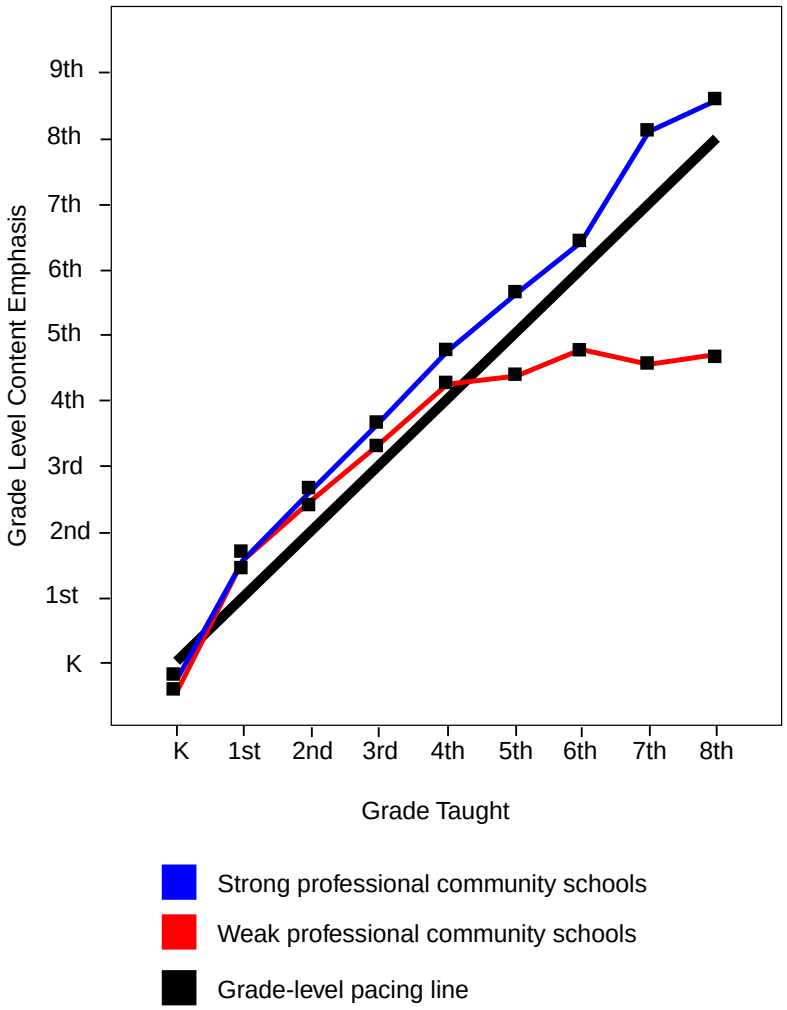
Schools with High Mobility Have Pacing Problems



Note: Schools in the lowest quartile, low-mobility schools, have less than 19 percent mobility. The top-quartile (high-mobility) schools experience more than 34 percent mobility.

An organizational antidote: school-based professional community. We also considered in our analysis how a variety of school organizational characteristics might influence the pace of instruction.[12] One organizational characteristic stood out as especially important: the level of professional community among teachers. As we have elaborated in earlier Consortium reports, three core activities characterize adult work in a professional community. First, teachers regularly engage in reflective conversations that hold teaching practices and student performance up to scrutiny. Second, to substantiate these conversations, teachers open their classroom doors to share their work with peers and to lend a public character to their teaching. This openness leads to a third key characteristic—peer collaboration. Through shared work, teachers learn from one another and continue to develop the skills, knowledge, and ideas necessary for continuous school improvement. Undergirding these professional behaviors is a set of shared beliefs and values, central to which is a collective responsibility for student learning. In sum, schools with strong professional communities provide a normative environment that guides adult behavior and promotes strong commitments to the welfare and education of students.[13]

Schools with Strong Professional Community Report Faster Pacing Figure 10



Note: **Strong professional community schools** comprise the top 25 percent of the CPS elementary schools on the professional community index. **Weak professional community schools** comprise the bottom 25 percent of the CPS elementary schools on the same index.

We found strong relationships in our analysis between the instructional pacing of a school and its level of professional community. Figure 10 shows the results. In this figure, we compare the pacing trajectories of the CPS schools with the strongest measures of professional community (the top 25 percent) to those with the weakest measures (the bottom 25 percent). Notice that students who attend an elementary school where faculty enjoy strong professional community tend to receive instruction closely aligned with the ITBS math content standards (i.e., consistently at or above the ITBS grade-level mastery line). On the other hand, in schools where teachers work in isolation and do not collaborate—i.e., a weak professional community—students pay a price. While it doesn't significantly affect students in kindergarten through fourth grade, students in succeeding grades experience slower curriculum pacing.

It is important to emphasize that this difference remains even when various aspects of students' background are taken into account. To demonstrate the independent influence of professional community on pacing, Figure 11 presents results from an analysis of high-poverty schools only. Although the pacing trajectories for these high-poverty schools are somewhat weaker than the system as a whole, we again observe a large pacing gap between schools that have strong professional community and those that do not.

In short, it isn't just the backgrounds of the students that slows down instruction, it is also the way teachers do or do not work together in the school. Our results indicate that when teachers do not collaborate in their curriculum development and teaching, do not regularly confer with one another, and do not reflect on their practices and outcomes, slower pacing with more extensive repetition and review is likely to ensue.

Conversely, schools with a strong professional community are places in which the faculty seem much more able to pursue grade-level learning goals. This positive relationship offers promise for schools seeking to develop better pacing and alignment of their instructional programs. While there is no precise recipe for how to develop teachers' professional community, its key building blocks—common goals, collaborative work, frequent dialogue

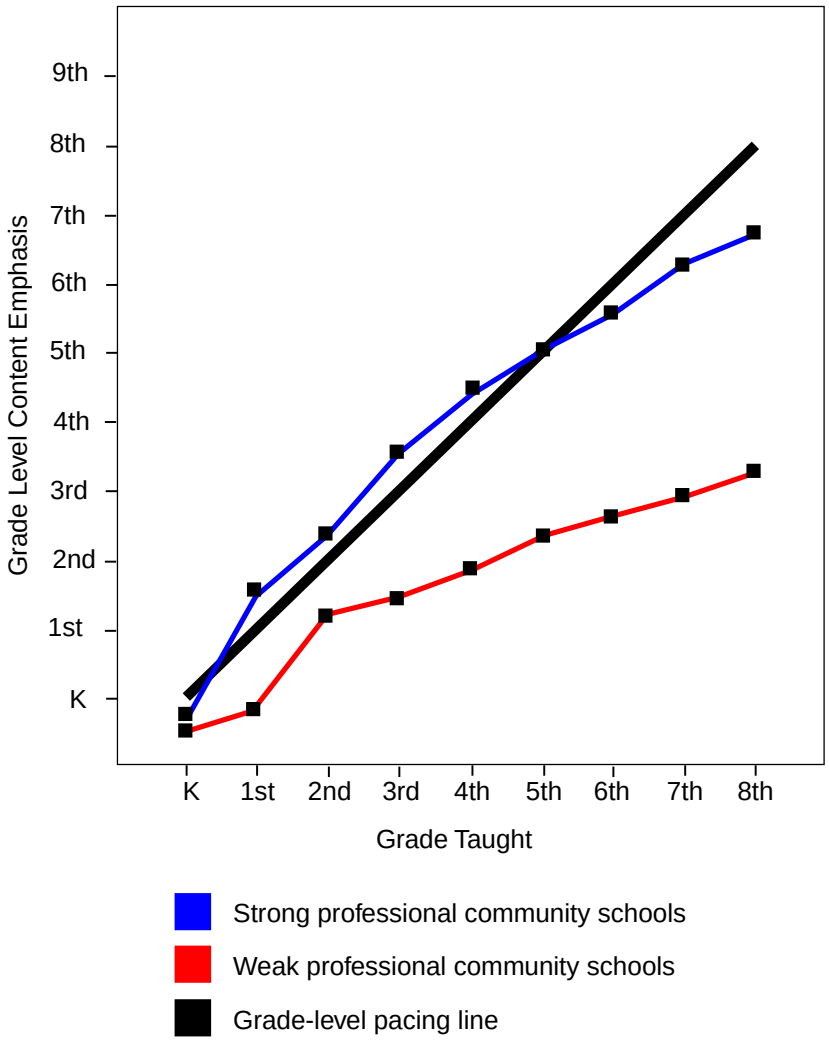
about improving practices, and a strong sense of collective responsibility—provide the needed social and structural supports for teachers to tackle pacing and alignment problems.

Grade-Level Coherence

A school's instructional pacing trajectory describes the overall opportunity to learn afforded by a school as students pass through the elementary grades. This is a school-wide average. Any individual student's experience, however, consists of exposure to a specific set of classrooms across grade levels. We note this distinction because we often found in our field observations considerable variability in instruction among classrooms at the same grade. In such situations, a school's *average* pacing trajectory might appear appropriate, but it would not necessarily indicate that all students attending that school experience consistent instruction. A student may be in a classroom that is well below average one year and above average the next. For example, consider again the sequence of literacy lessons we presented in Figure 1. Students may not move straight down the columns, but back and forth from one side to the other as they progress through the grades. Such students might lose time studying topics they already know one year and encounter topics they are entirely unprepared to tackle the next. The more variable the content coverage is within any given grade, the more likely it is that students will receive incoherent instruction as they pass from grade to grade.[14] Examining the grade-level coherence of instruction allows us to consider the likelihood that students experience these problems.

Figure 11

Strong Professional Community Improves Curriculum Pacing in High-Poverty Schools



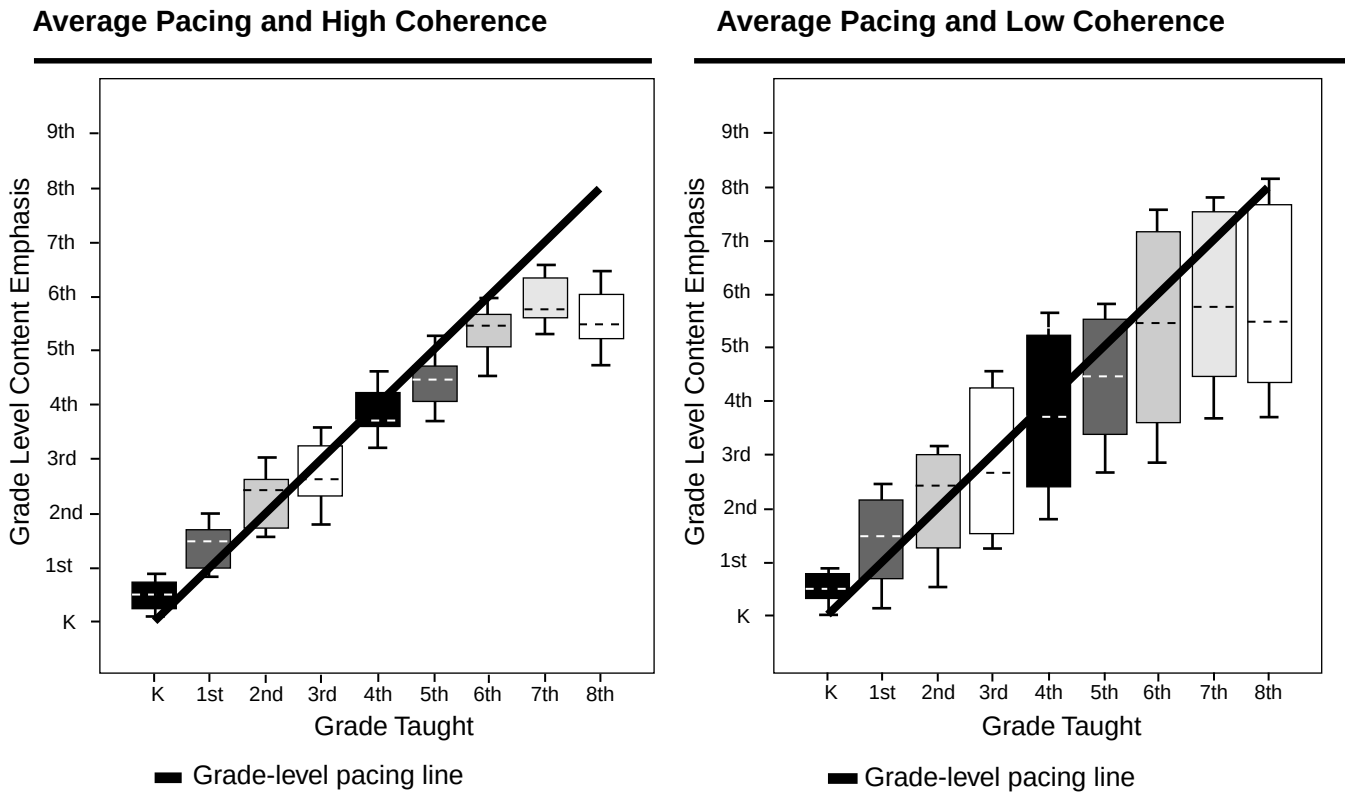
Note: These results are for CPS elementary schools that enroll 90 percent or more low-income students.

We returned to teachers' content emphasis reports and computed a measure of the similarity in math content coverage among teachers by grade level. If most teachers working in the same grade report that they cover a similar set of math topics, their school's measure of grade-level coherence would be high. In contrast, if these teachers' reports within grade levels do not overlap much, their measure of grade-level coherence would be low.[15]

Figure 12a

Figure 12b

Comparison of Schools with High and Low Within-Grade Instructional Coherence



To illustrate the magnitude of grade level incoherence, we grouped together all of the schools with approximately average instructional pacing trajectories and then examined their grade-level coherence.[16] Figure 12a summarizes teachers' reports of content coverage from schools in the top quartile in grade-level coherence; Figure 12B summarizes reports from the bottom quartile. Notice that the box plots in Figure 12a indicate relatively little spread in teacher reports about content emphases at each grade level. There is also a steady upward trend in the box plots across most grades, demonstrating that teachers in these grades are presenting new and more difficult topics each year.

As a result, the students in this first group of schools are likely to be receiving a coherent program of instruction over time. In contrast, the box plots in Figure 12b demonstrate extensive variability among classes at the same grade level. As a result, some students in these schools might, for example, receive the third-grade curriculum in two successive years; others might study the third-grade curriculum one year and then enter a class the next fall aimed at fifth-grade material. In short, both gaps in instruction and repetition of topics may well be experienced by these students.

Effects of school composition and organizational factors. As was the case for instructional pacing, we found that school composition and organizational characteristics had a substantial effect on grade-level coherence. Again, even after we controlled for prior school achievement, we found that schools with high proportions of impoverished families are much more likely to have incoherent curricula, as are large schools and schools with high levels of student mobility. On the brighter side, the positive relationship demonstrated between a strong school-based professional community and instructional pacing also extends to grade-level coherence. Coherence is more likely in schools where teachers work collaboratively and share collective responsibility for student learning.

Across all our analyses, we find that the weak pacing and coherence that limits students' opportunities to learn persistently characterize many of the system's high poverty schools. The patterns here are quite vivid: in some of the math programs we examined, the pace of learning slows to such a great extent that little to no new material is introduced across the last several years of elementary schooling. This result means that tens of thousands of Chicago students attend schools that fail to provide equitable, grade-appropriate opportunities to learn. Moreover, our extensive classroom observations indicate that this pattern exists in language arts instruction as well. This finding leaves us with a major challenge: If students are not exposed to the knowledge and skills they are tested on, how then are they to achieve the competencies expected of them?

A Growing Research Base Documents the Effects of Professional Communities

The findings on professional community presented in this report add to a growing body of literature on its importance to urban school improvement. The Consortium first introduced the concept of school-based professional community in its 1995 report, *Charting Reform: Chicago Teachers Take Stock.* Early work on this idea emerged out of a collaboration with colleagues at the federally funded Center on Organization and Restructuring of Schools at the University of Wisconsin-Madison.[1] About the same time, closely related ideas were being developed at the federally funded Center on School Context at Stanford University.[2]

Over the last five years, evidence has emerged confirming the benefits of schools organized around the professional norms we have described. For example, Newmann and Wehlage found teachers' professional community to be a critical characteristic of restructured schools that successfully engage students in challenging intellectual work.[3]

In our previous research, we found that weak school-based professional community characterizes the lowest achieving elementary schools in Chicago, as well as most of the city's high schools.[4] In contrast, Chicago schools with strong professional communities are more likely to have school climates focused on student learning. Evidence is also beginning to appear that strong professional community among teachers may play a key role in sustaining long-term efforts to improve student achievement.[5]

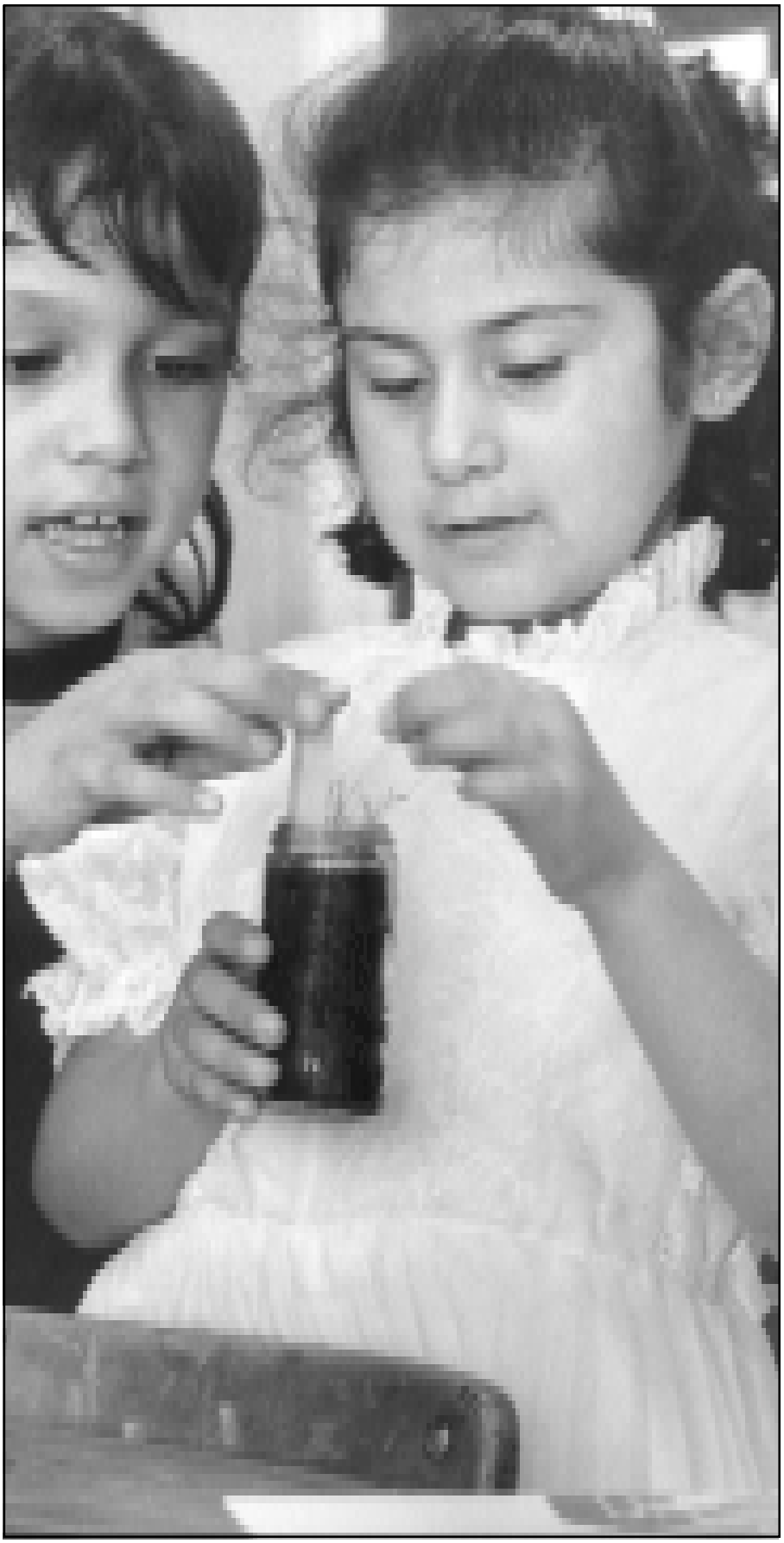
[1]See Kruse, Seashore-Louis, and Bryk (1995).

[2]See Talbert and McLaughlin (1994).

[3]See Newmann and Wehlage (1995). See also McLaughlin and Talbert (1993).

[4]See Sebring et al. (1995).

[5]See Designs for Change (1998). See also Bryk, Sebring, et al. (1998).



Interpretive Summary

Every day Chicago teachers have to juggle dozens of considerations about the young people they teach and the learning goals they strive to reach. Unforeseen events arise; students fail to grasp new material in the allotted time. But what happens when the juggling, borrowing, and repeating extends past one or more school years? Our research argues that unaligned and incoherent instructional programs emerge. Students who pass through these programs experience delays, repetitions, and/or skips in core knowledge and skills in ways that seriously diminish their chances for success in school and, in particular, on the tests used to measure their knowledge and their progress.

A First-Step: Learning Standards

In the current debates on school improvement, the reform most directly associated with instructional pacing and coherence is the standards movement. Indeed, both the Illinois State Board of Education and the Chicago Public Schools have issued official learning goals and standards that articulate what students are expected to know at various grade levels. The Chicago Public Schools are even working to develop daily lesson plans that illustrate these standards. In our view, well designed and properly promoted learning standards can assist teachers in reorganizing their teaching and expectations into more coherent and effective programs of instruction. They may also foster educational equity by promoting more common learning opportunities for students, regardless of their background and the individual schools and classrooms they attend.

It is critical to remember, however, that curriculum standards are not new to the Chicago schools. Official "scope and sequences," not to mention thousands of textbooks outlining grade level curricula, have been issued for years. Indeed, the ITBS itself constitutes a long-standing and powerful form of curricular guidance. Our research makes clear that external guidelines and mandates do not, by themselves, prevent troubling differences in teaching and learning from occurring. As necessary and challenging as it is to develop high quality learning standards, standards documents must be understood as only the first step in a series of changes that actually influence how schools organize and conduct instruction.

A Need to Strengthen Schools as Organizations

If, in spite of the best laid plans, it is common for teachers to slow down instruction, what might keep the curriculum moving forward? What will help teachers push students into new learning? Our research suggests that individual teachers need social support to counter the resistance put forth by students as well as the doubts they themselves have about what their students have been taught and are capable of learning. This study finds that some of the most promising supports reside in key organizational characteristics and qualities of the school.

In particular, good teacher communication and collaboration play a vital role in bringing standards from paper to practice and in shaping how instruction develops and progresses across classrooms and grades. Professional interaction and reflection among teachers can provide perspective and clarity, whether it is through informal sharing of information or formal analysis of what is being taught and produced in each classroom and at each grade level. These are the operational dynamics of a school-based professional community at work.

We also find that closer physical and social proximity among members of a school community can offer powerful assistance. Small schools with fewer students in each grade facilitate social familiarity and shared knowledge that reduce some of the doubts and ambiguities that can slow instructional programs. To be sure, small school size does not guarantee more positive relations and instructional coordination. Such processes, however, are much easier for committed adults to sustain in such an environment.

Perhaps most troublesome are the negative relationships we found between high levels of student mobility and instructional pacing and coherence. Currently, when new students enter a school, little information about their past instruction accompanies them, even if they are transferring from another CPS school. Typically, they are simply assigned to the classroom at the age-appropriate grade level with the most vacant seats. Rather than undertaking a careful diagnosis of new students' knowledge and skills in order to make the best instructional placement possible, these new students are routinely distributed around so that "all teachers get their fair share." Thus, we neither assure instructional continuity through systemwide curriculum pacing and coordination nor through individualized assessment and placement. As a result, many of these new students experience less school

success than their more stable peers. Just as troubling, teachers in high mobility schools resort to even slower pacing to accommodate the ever changing range of student knowledge and experience in their classroom—an understandable response, but one that unfortunately affects all of the students in the classroom.[17] To be clear, this problem is not an issue that individual classroom teachers can solve alone; rather, it demands coordinated school- and system-level action.

Fortunately, the school characteristics that we have identified as significantly related to grade-level pacing and instructional coherence—stronger professional community that sustains rich systems of teacher sharing and reflection, smaller school size, and lower levels of student mobility—can all be influenced by policy action. Positive developments in each of these areas can advance students' opportunities to learn in a more systematic manner. Moreover, the future success for institutionalizing new standards for teaching and learning across the Chicago schools may well rest on school- and system-level attention to these key organizational concerns.

Endnotes

[1]See Stodolsky (1988).

[2]For the purposes of this research, the test form used by the CPS in 1994, identified locally as CPS94, was used. Since the ITBS is not designed to be standards-based in the way that we are using it in this study, the link between content emphasis and scoring at national norms does vary some from form to form. Since the survey data were collected in 1994, the choice of this test form seemed most sensible. This test form was reused by the CPS in 1996 and 1998.

[3]The results presented here are based on Rasch test item analysis. Within this test theory, mastery level is defined as a 75 percent probability of getting any particular item correct. Formally, each item has a difficulty measure in logits which also represents a 50 percent probability of a correct response. By adding 1.1 logits to this difficulty level, we estimate the mastery level. For a further discussion of our use of these test equating techniques, see Bryk, Thum, Easton, and Luppescu (1998).

[4]We performed a separate Rating Scale Analysis (see Wright and Masters, 1982) on the teacher content reports, where we anchored the content category difficulties based on the results from the ITBS Rasch Analyses. This made the content emphasis scale comparable to the ITBS difficulty scale, allowing us to produce an "initial pacing trajectory" based on the content emphasis data for each school. Then, in order to establish a precise equating between content emphasis reports and actual student assessed competencies, we examined the initial pacing trajectories for a sample of schools with students scoring at national norms. This allowed us to introduce a final adjustment to the pacing trajectories that permits the direct equating of content emphasis reports and ITBS test results. For a further discussion of these analyses, see Smith and Bryk (Forthcoming).

[5]This line is empirically derived based on teachers' reported content emphases in schools where students score near national norms.

[6]The survey data from each math teacher in the school were scored in terms of content emphases. A two-level HLM analysis (teachers within schools) was then undertaken. At level 1 (within schools), teacher's content emphasis was predicted by grade level. This produced a pacing trajectory for each school that was allowed to vary at level 2.

[7]These results are based on a two-level HLM analysis where an instructional pacing trajectory is calculated for each school at level 1 and the shape of those trajectories is predicted by a variety of characteristics at level 2, including prior achievement level and percent low income enrollment.

[8]See, for example, Marks (1997).

[9]These findings are confirmed in HLM analyses like those used for examining percent low-income effects. The illustrative results presented in Figure 7 are overall group differences, unadjusted for other factors.

[10]See Bryk, Easton, Kerbow, Rollow, and Sebring (1993), 19-20. Also see Sebring et al. (1995), and Sebring et al. (1996).

[11]See, for example, Porter (1994). Also, see Schmidt et al. (1998), and Stevenson and Stigler (1992).

[12]The school organizational measures considered here derive from the Consortium's work on "Essential Supports for Student Learning." They include key aspects of school leadership, school-community partnerships, school climate, and professional community and development. For more details see Sebring et al. (1995), and Sebring et al. (1996).

[13]See Sebring et al. (1995). We note that while it is possible that teachers could apply their collective attentions and efforts to issues unrelated to curriculum pacing and the demands of the ITBS, it would be difficult for a faculty to plan and align its curriculum and its pacing without the supportive dynamics of a professional community in the school.

[14]To study this problem fully, we would like to have longitudinal student data over time that tracks the specific subject matter and skills to which students are exposed. Unfortunately, the current Consortium database consists only of cross-sectional information on this topic. We note that it is possible for individual students to receive coherent instruction in schools characterized by weak grade level coherence if the school deploys ability grouping or tracking. We intend to investigate this further in future research.

[15]To compute the grade-level coherence measure, we began by estimating for each school, using a two-level HLM analysis, an empirical Bayes pacing trajectory based on teachers' content emphasis reports by grade (level 1) and an unconditional model at level 2. We then computed the residual variance of teacher reports around this pacing trajectory for each school. High residual variance means grade-level incoherence; low residual variance means high grade-level coherence.

[16]A subset of 22 schools that had pacing trajectories approximately equal to the systemwide average were selected. These 22 schools were divided into thirds according to their coherence levels. The figures display content emphasis reports by grade level in the top and bottom third of these schools, respectively.

[17]For further discussion of the dynamics and consequences of school mobility in Chicago, see Kerbow (1996).

References

Bilcer, Diane King, Stuart Luppescu, Penny Bender Sebring, and Yeow Meng Thum (1996). *The Charting Reform Survey Series: Public Use Data*. Chicago: Consortium on Chicago School Research.

Bryk, Anthony S., John Q. Easton, David Kerbow, Sharon G. Rollow, and Penny A. Sebring (1993). *A View from the Elementary Schools: The State of Reform in Chicago*. Chicago: Consortium on Chicago School Research.

Bryk, Anthony S., Penny Bender Sebring, John Q. Easton, Stuart Luppescu, Yeow Meng Thum, Jenny Nagaoka, and Diane King Bilcer (1998). *Chicago School Reform: Linkages between Local Control, Educational Support, and Student Achievement*. Paper presented at the annual meeting of the American Educational Research Association, San Diego.

Bryk, Anthony S., Yeow Meng Thum, John Q. Easton, and Stuart Luppescu (1998). *Academic Productivity of Chicago Public Elementary Schools*. Chicago: Consortium on Chicago School Research.

Designs for Change (1998). *Chicago Elementary Schools with a Seven-year Trend of Improved Reading Achievement: What Makes These Schools Stand Out*. Chicago: Author.

Kerbow, David (1996). Patterns of Urban Student Mobility and Local School Reform. *Journal of Education of Students Placed at Risk, 1* (2), 147-169.

Kruse, Sharon D., Karen Seashore-Louis, and Anthony S. Bryk (1995). Professionalism and Community: What Is It and Why Is It Important in Urban Schools? An Emerging Framework for Analyzing School-based Professional Community. In Karen Seashore-Louis and Sharon D. Kruse, *Professionalism and Community: Perspectives on Reforming Urban Schools*. Thousand Oaks, CA: Crown.

Marks, Helen M. (1997). Student Engagement in Instructional Activity: Patterns in the Elementary, Middle, and High School Years. (Revision of *Student Engagement in the Classrooms of Restructured Schools.* Madison, WI: Center on Organization and Restructuring of Schools, 1995.) Unpublished.

McLaughlin, Milbrey W., and Joan E. Talbert (1993). Introduction: New Visions of Teaching. In David Cohen, Milbrey W. McLaughlin, and Joan E. Talbert, *Teaching for Understanding: Challenges for Policy and Practice.* San Francisco: Jossey-Bass.

Newmann, Fred M., Gudelia Lopez, and Anthony S. Bryk (1998). *The Quality of Intellectual Work in Chicago Schools: A Baseline Report.* Chicago: Consortium on Chicago School Research.

Newmann, Fred M., and Gary G. Wehlage (1995). *Successful School Restructuring: A Report to the Public and Educators.* Madison, WI: Center on Organization and Restructuring of Schools.

Porter, Andrew C. (1994). The Uses and Misuses of Opportunity-to-Learn Standards. *Educational Researcher 24*, 21-27.

Schmidt, William H., Curtis C. McKnight, Pamela M. Jakwerth, Leland S. Cogan, Senta A. Raizen, Richard T. Houang, Gilbert A. Valverde, David E. Wiley, Richard G. Wolfe, Leonard G. Bianchi, Wen-Ling Yang, Seung-Ho Kang, and Edward D. Britton (1998). *Facing the Consequences: Using TIMSS for a Closer Look at United States Mathematics and Science Education*. Boston: Kluwer Academic Publishing.

Sebring, Penny Bender, Anthony S. Bryk, John Q. Easton, Stuart Luppescu, Yeow Meng Thum, Winifred A. Lopez, and BetsAnn Smith (1995). *Charting Reform: Chicago Teachers Take Stock*. Chicago: Consortium on Chicago School Research.

Sebring, Penny Bender, Anthony S. Bryk, Melissa Roderick, Eric Camburn, Stuart Luppescu, Yeow Meng Thum, BetsAnn Smith, and Joseph Kahne (1996). *Charting Reform in Chicago: The Students Speak*. Chicago: Consortium on Chicago School Research.

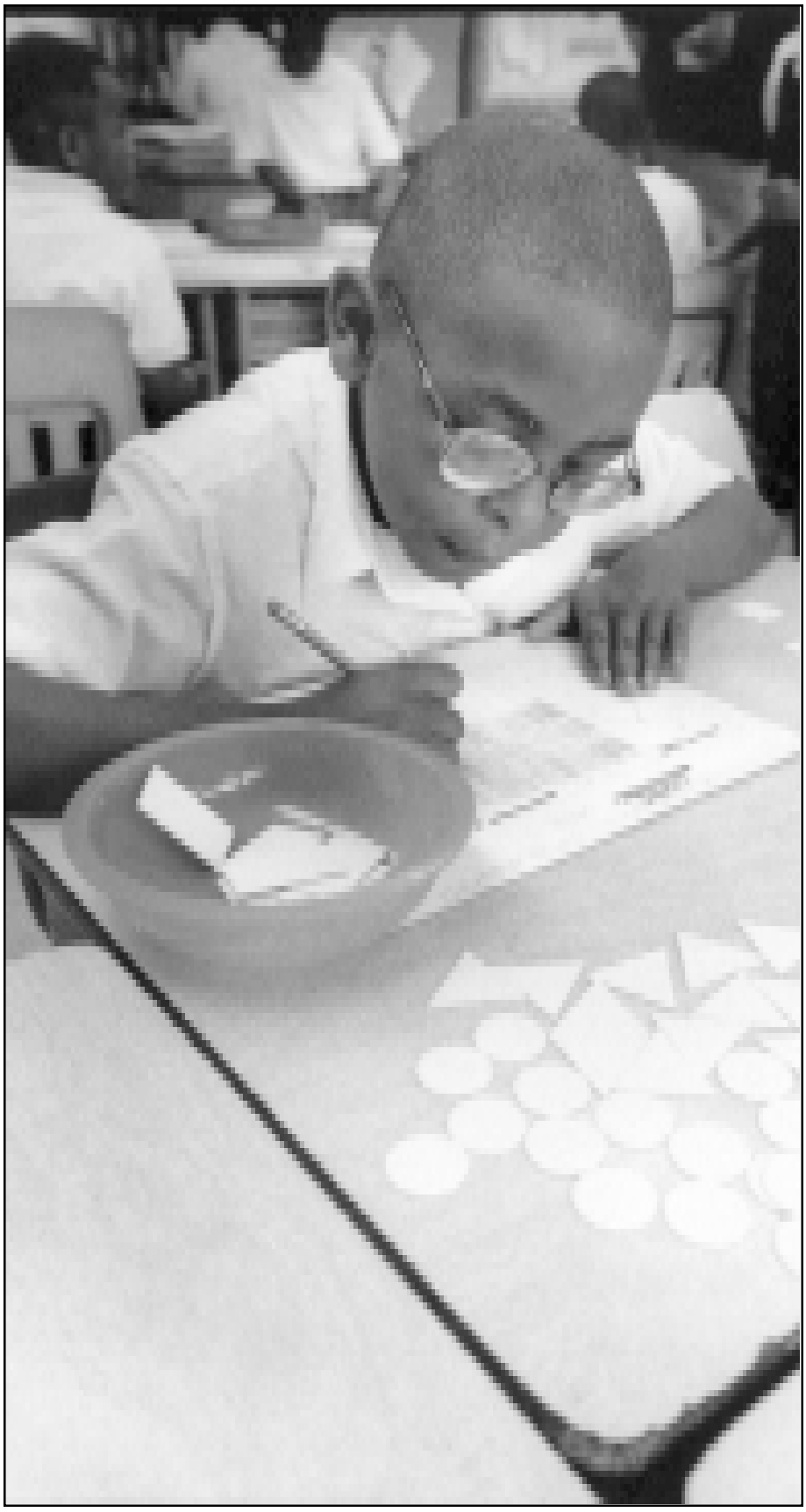
Smith, Julia B., and Anthony S. Bryk (Forthcoming). *An Organizational Analysis of Students' Opportunity to Learn Mathematics*.

Stevenson, Harold W., and James W. Stigler (1992). *The Learning Gap: Why Our Schools Are Failing and What We Can Learn from Japanese and Chinese Education*. New York: Simon and Schuster.

Stodolsky, Susan S. (1988). *The Subject Matters: Classroom Activity in Math and Social Studies*. Chicago: The University of Chicago Press.

Talbert, Joan E., and Milbrey W. McLaughlin (1994). Teacher Professionalism in Local School Contexts. *American Journal of Education 102*, 123-153.

Wright, Benjamin D., and Geoff N. Masters (1982). *Rating Scale Analysis.* Chicago: MESA Press.



Notes

This report reflects the interpretations of the authors. Although the Consortium's Steering Committee provided technical advice and reviewed an earlier version of this report, no formal endorsement by these individuals, their organizations, or the full Consortium should be assumed.

Consortium on Chicago School Research

Mission

The Consortium on Chicago School Research is an independent federation of Chicago area organizations that conducts research on ways to improve Chicago's public schools and assess the progress of school improvement and reform. Formed in 1990, it is a multipartisan organization that includes faculty from area universities, leadership from the Chicago Public Schools, the Chicago Teachers Union, education advocacy groups, the Illinois State Board of Education, and the North Central Regional Educational Laboratory, as well as other key civic and professional leaders. The Consortium does not argue a particular policy position. Rather, it believes that good policy is most likely to result from a genuine competition of ideas informed by the best evidence that can be obtained.

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