VUE
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Winter 2007

Toward Proficiency

Intellective Competence
Edmund W. Gordon

Academic Proficiency: Bright Hopes, Blurry Vision
Lauren B. Resnick and Lindsay Clare Matsumura

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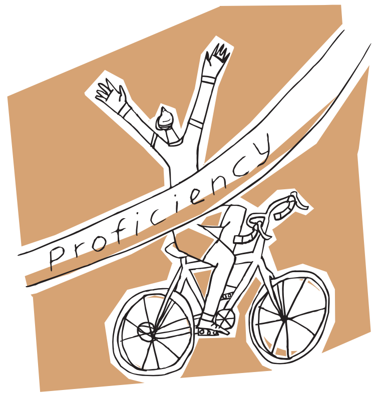

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From “Basic” To “Proficient”

Robert Rothman

The No Child Left Behind (NCLB) Act created an audacious goal for American education: by 2014 – just seven years from now – all children must be “proficient” in reading and mathematics. And the law puts teeth into its rhetorical admonition by holding schools strictly accountable for bringing students along on a trajectory toward that goal. Schools that fail to demonstrate “adequate yearly progress” toward the 2014 target are subject to increasingly stringent sanctions.

The proficiency goal in effect turns the notion that “all children can learn” – a staple of school and district mission statements – into national policy. Yet, while there is widespread support for this idea, the “proficiency for all by 2014” goal has become increasingly controversial.

Some of the controversy stems from the law’s fine print. Although all students are expected to be proficient, NCLB leaves the definition of *proficiency* up to each state – and states have defined it in widely varying ways. As a result, in some states, nearly all students are already proficient, while in others fewer than half of students have reached that level of achievement.

In addition, some commentators have stated that the goal is unreachable. At a recent forum sponsored by the Campaign for Educational Equity at Teachers College, Robert L. Linn of the University of Colorado at Boulder stated that at the current rate of improvement, only half of fourth-graders and 39 percent

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of eighth-graders would be proficient in mathematics by 2014, and only a third of students at either grade would be proficient in reading by 2018. At the same forum, Richard Rothstein of the Economic Policy Institute suggested that the goal of proficiency for all is itself an oxymoron: if the goal were high enough, not every student would be able to reach it, and if it were low enough for every student to reach, it would not constitute "proficiency" in a real sense.

Despite these very real issues, there is a widespread recognition that the level of performance for many students, particularly students in urban schools, must be substantially higher than it is now if these students are to have any prospect for a fulfilling, productive future. The reforms that districts and schools have undertaken over the past two decades have brought students from *below the basic* level of performance to *basic*, at best. Much more is needed to bring them to *proficiency*.

But what, exactly, is proficiency? And what would it take to bring students to that level? This issue of *Voices in Urban Education* offers five perspectives on these questions.

Edmund Gordon defines *proficiency* as "intellective competence," and suggests ways that schools and communities can develop such competence in young people.

Lauren Resnick and Lindsay Clare Matsumura note that expectations for students have increased substantially over the past few centuries and they offer examples to illustrate the "bright line" that separates the previous goal of basic performance from proficiency.

Louis Gomez, Phillip Herman, and Kimberly Gomez outline the characteristics of proficiency in one subject area, science, and show how students who appear to be far below grade level in reading ability are able to demonstrate higher levels of skill.

Richard Sohmer and Sarah Michaels describe a program that began as an after-school club which enables previously low-performing students to demonstrate high levels of ability by drawing on the knowledge they come to school with.

Rhonda Lauer suggests that proficiency encompasses more than academic competencies and examines efforts under way in Philadelphia to develop broad competence among students.

These articles suggest that there is somewhat of a consensus on what constitutes proficiency and that, in the consensus view, proficiency demands fairly high levels of ability. These abilities, moreover, are not just "a little more" than basic skills; they are *qualitatively* different. Achieving them takes more than simply ratcheting up teaching and learning.

There is also a growing recognition that schools alone cannot accomplish this task. Affluent families already know this; children from relatively well-off families not only receive high-quality instruction in school, but also visit museums, join clubs, and engage with professionals in the workplace. Children from low-income families tend to lack these resources, so the inequalities they face in school are magnified.

The challenge is to marshal the resources cities have for learning and make them more widely accessible, particularly for youths who have been poorly served in schools. Only then, with stronger support for learning in and out of school, can we move *all* students toward proficiency.

Intellective Competence

Edmund W. Gordon

The ability to use knowledge to engage and solve problems, not just acquire knowledge, is increasingly the currency of advanced societies. The goal should be to develop such abilities in a broader range of young people.

The concern with what it means for students to be proficient is not unrelated to my long-time concern with the development of what I have called intellective competence. In our book *Affirmative Development: Cultivating Academic Ability*, Beatrice Bridglall and I make the case for the "affirmative development of academic ability," in which we argue that intellective competence, increasingly, is the universal currency of technologically advanced societies (Gordon & Bridglall 2006). What are the characteristics of this universal currency?

While my list of characteristics begins with an emphasis on rigorous academic experiences and achievement, I do not stop there. The mastery of academic learning is, for me, only instrumental to the development of intellective competence. In my vision of teaching, learning, and assessment, academic-outcome standards are central, but the explication of what we want learners to *know* about specific disciplines and to be able to do academically must be considered as instrumental to what we want learners to *become*. I have argued that it is important for learners to become compassionate human beings, capable of rational adaptation of and to the world around us and capable of using mental processes, information, and available resources to solve problems. There is no question about the importance of what students learn and are taught. Most of us would agree that teaching and learning independent of content (subject matter) is problematic. However, just as teaching and learning without subject matter is vacuous, teaching and learning should not be so constrained by content that the purpose of engagement with these pedagogical endeavors is precluded.

I am more and more persuaded that the purpose of learning – and the teaching by which it is enabled – is to acquire knowledge and technique in the service of the development of adaptive human intellect. I see these as being at the core of intellective competence. The old "scholastic aptitudes" may not have been so far from the mark. In the effort to achieve some distance from the actual material covered in the nation's diverse curricula, the scholastic aptitudes or abilities were conceived of as more generic capacities to handle academic work. But, more important, scholastic ability has come

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to reflect the meta-manifestations of intellective abilities that result from particular kinds of education and socialization. It may be more appropriate that instead of scholastic aptitudes, we think of developed expressions of a wide range of human learning achievements, some of which are related to what happens in schools – and all of which are related to sense making and problem solving.

These developed abilities are not so much reflected in the specific discipline-based knowledge a student may have, but in the student's ability and disposition to adaptively and efficiently use knowledge, technique, and values through mental processes to engage and solve both common and novel problems. James Greeno (2006) suggests that what I call intellective competence is really "intellective character."

Understanding Intellective Competence

What is intellective competence? I have come to use the term to refer to a characteristic way of adapting, appreciating, knowing, and understanding the phenomena of human experience. I also use the construct to reference the quality with which these mental processes are applied in one's engagement with common, novel, and specialized problems. Intellective competence reflects one's habits of mind, but it also reflects the quality or goodness of the products of mental functioning.

Like social competence, which I feel is one manifestation of intellective competence, it reflects "goodness of fit," or the effectiveness of the application of one's affective, cognitive, and situative processes to solving the problems of living. Twenty years ago I might have used the term "intelligence" or "intelligent behavior" to capture this characteristic or quality of one's mental capabilities or performance. In 2006, I am concerned with more. I am trying to capture aspects of human capability, developed ability, and disposition to use and appreciate the use of human adaptive processes in the service of intentional behavior. I am not surprised that James Greeno (2006) calls it a manifestation of character. No matter what we call it, I argue that intellective competence can be created through the deliberate development of academic ability. The task to which I am committed in my next career is the "affirmative development of academic ability" in a broader range of human beings.

These developed abilities are reflected in the student's ability and disposition to use knowledge, technique, and values through mental processes to engage and solve both common and novel problems.

Deliberatively Developing Academic Ability

Within the education establishment, we know a great deal about the deliberate development of academic ability. I propose that the education community use that knowledge to embark upon a deliberate effort to develop academic abilities in a broad range of students who have a history of being resource deprived and who, as a consequence, are underrepresented in the pool of academically high-achieving students. The deliberative or affirmative development of academic ability should include more equitable access to such educational interventions as:

- Early, continuous, and progressively more rigorous exposure to joyful pre-academic and academic teaching and learning transactions. This exposure should begin with high levels of communicative, literacy, numeracy, and self-regulatory development.
- Rich opportunities to learn through pedagogical practices traditionally thought to be of excellent quality. We do not need to wait for new inventions: Benjamin Bloom's Mastery Learning, Robert Slavin's Success for All, James Comer's School Development Program, Bob Moses's Algebra Project, Vinetta Jones's Equity 2000, the College Board's Pacesetter, and Lauren Resnick's "effort-based thinking curriculum" all attempt to do some of this.
- Diagnostic, customized, and targeted assessment; instructional and remedial interventions.
- Academic acceleration and content enhancement.
- The use of relational data systems to inform educational policy and practice decisions.
- Explicit socialization of intellect to multiple cultural contexts.

- Exposure to high-performance learning communities.
- Explication of tacit knowledge, meta-cognition, and meta-componential strategies.
- Capitalization of the distributed knowledge, technique, and understanding that reside among learners.
- Special attention to the differential requirements of learning in different academic domains.
- Encouragement of learner behaviors such as deployment of effort, task engagement, time on task, and resource utilization.
- Special attention to the roles of attitude, disposition, confidence, and efficacy.
- Access to a wide range of supplementary educational experiences.
- The politicalization of academic learning in the lives of communities of culturally subordinated people.

It is possible that the attention we give to improving the quality of teaching and to broadening access to good teachers, while being *necessary* to the achievement of academic proficiency, may not be *sufficient*. Increased attention may need to be given to *learning*.

Developing Personal Agency

Important as these educational interventions are, the matter of personal agency may be even more so. It is possible that the attention we give to improving the quality of teaching and to broadening access to good teachers, while being *necessary* to the achievement of academic proficiency, may not be *sufficient*. Increased attention may need to be given to the *learning* domain of the "teaching and learning" dyad. Good teaching is necessary, but it may take appropriate student learning behaviors to achieve proficiency. In my thinking about learning behavior on the part of the student, I tend to privilege:

- Time on tasks related to what has to be learned.
- Deliberate deployment of energy and effort to those tasks.
- Seeking and utilizing necessary human and material resources.
- Personal efficacy – the belief that the learning goals and related tasks are worth the effort.

These are the learner behaviors and attitudes that result in what Albert Bandura (1982) calls "agentic behavior" – purposeful action on behalf of the self and others. In the final analysis, academic proficiency requires the necessary conditions for learning and sufficient effort on the part of both teachers and learners.

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Academic Proficiency: Bright Hopes, Blurry Vision

Lauren B. Resnick and
Lindsay Clare Matsumura

The expectations for learning for all young people have increased steadily over the past few centuries, toward what we now consider proficiency. But the "bright line" between proficiency and basic levels of achievement is at risk of being obscured by current testing and accountability policies.

As America settles into a standards- and accountability-driven education system, many elements of the process that had seemed self-evident or simple in initial conception are now understood to be problematic. In addition, some decisions made in political negotiations worked temporarily because those pressing for a major new way of governing the country's education system found it convenient to ignore some potentially divisive issues.

Among these decisions and issues is what it means for students to be "proficient." The term came into use as part of a broad national consensus that educational outcomes were too low across the nation, and especially so for our minority and poverty students. The standards and accountability strategy, embodied in the 2002 No Child Left Behind legislation but, in fact, negotiated in a bipartisan political environment over the entire preceding decade, became America's strategy for meeting radical new equity goals in education.

The entire educational accountability system depends on agreements about proficiency and reasonable expectations for reaching proficiency across the spectrum of students served by our schools. Do we really agree, however, on what we mean by the term? Or are we using a common word to mask important discrepancies? Most important, are the discrepancies creating inequities for students and teachers?

In this essay we explore the various meanings that the term *proficiency* can have, building on the changing expectations for universal literacy in Europe and the United States over four centuries. We will show how the meaning of being *literate* has changed dramatically over centuries and how meanings attached to the term have depended, in part, on what proportion of the population a society considered an appropriate target for educational effort.

Shifts in the Meaning of Literacy*: Four Centuries of Redefinition*

There is probably no place or time in history when there has not been a struggle over who should be educated – and to what standards of competence. In the middle ages, individuals were considered literate, for legal purposes, if they could sign their names – rather than marking an *X* or providing a thumbprint on a legal document.

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Knowing how to read, even a little, was a mark of distinction. No one expected serfs to read, and few thought that literacy was needed for anyone except scholars, some clergy, and those charged with administering the affairs of the landed aristocracy. As the medieval period came to an end, various forces – both economic and social – led to increasing expectations for more people who could read, write, and do various forms of written arithmetic. These forces were religious, economic, military, and national.

In seventeenth-century Sweden, the Lutheran church began a movement for a very basic form of universal literacy. As part of building commitment to the church and its tenets, the clergy sought universal familiarity with its fundamental text, Luther's *Little Catechism*. To this end, they set out to teach everyone to "read" (actually recite with the text before them) the *Catechism* and give the expected answers to a list of questions that accompanied the text. Church pastors traveled from farmstead to farmstead across the country, testing each member of the family's ability to meet this standard and, when necessary, assigning a "literate" member of the family (i.e., someone who could perform to the above standard) to teach the as-yet illiterate member.

Obviously, this was a standard of literacy that would not qualify even as *basic* literacy in today's world. It did not require anyone to read an unfamiliar text, the questions were all standardized, and answers were known in advance. Today, we would call such a performance *below basic*. Yet it was the first step to universal literacy for Sweden, and within a couple of generations there was virtually no illiteracy left in that country (Resnick & Resnick 1977). Other countries developed similar policies and practices suited to their own religious cultures.

Fast forward to the early nineteenth century. Citizen armies were coming into being in Europe (as they already had in America during the revolutionary period). There was movement from countryside to city. Craft and trade guilds were breaking up, yet substantial amounts of "how to" knowledge needed to be transmitted. People were functioning in a money economy and needed written accounting of legal transactions, payments, and debts. There were new machines for which people needed to read technical manuals in order to navigate safely in factories and on roads. Forms of literacy that went beyond catechism were needed, and the idea of universal schooling – at least a few years of it – began to take hold.

A new standard of universal literacy and numeracy emerged. It came to be expected that everyone would be able to read and understand simple, but unfamiliar texts, follow simple written directions, write notes to one another, and read patriotic stories. The kind of reading that was universally sought is what we might today call a *basic* standard for about the third- or fourth-grade level. It took a century or more to meet the standard universally in industrialized countries. According to UNESCO data, this basic standard is just now being met in many countries of the world.

If we take as an estimated universal standard of proficiency the content of what everyone was expected to study in school, we might say that reading proficiency in the early 1950s meant, roughly, being able to read and discuss the content of local newspapers.

In mathematics, similarly, a universal basic numeracy expectation has gradually developed. In the middle of the nineteenth century, members of a school review committee in a French village reported that after interviewing candidates for a teaching post, they were very impressed with one of the candidates because he knew how to do three operations in arithmetic (addition, subtraction, and multiplication) and had heard of a fourth (division) (Hughes, as quoted in Resnick & Resnick 1997)! The situation would not have been very different in America: a universal standard of what we would today call basic calculation was aspired to, and it was to take until midcentury or beyond to achieve it (even if new immigrants were left out of the calculation).

Aspirations for universal literacy and numeracy have been rising ever since, but actual achievement of these aspirations has been slow. To give a sense of the trajectory, consider that in 1900 only about 10 percent of all Americans attended high school for even a year or two and by the mid–twentieth century the figure had risen to not much more than 50 percent. If we take as an estimated universal standard of proficiency the content of what everyone was expected to study in school, we might say that reading proficiency in the early 1950s meant, roughly, being able to read and discuss the content of local newspapers – not the national ones which were and are written at a higher linguistic and conceptual level. Of course not everyone met the standard, but it served to anchor employers' expectations for workers and families' hopes for their children. Those expectations, however, were well below what we are aiming for today, a half-century later.

Academic Proficiency in the Twenty-first Century

The point of the preceding historical excursion is not that what was good enough for grandpa is good enough for us. To the contrary, it is meant to remind us that what we today consider basic standards were at one time a challenging aspiration. Today we are aspiring to something much more challenging, a very high expectation that we have labeled *proficient*. It is a standard that in past centuries was expected only of those attending elite schools and post-secondary institutions. And we want *everyone* to achieve it. This is historically unprecedented. Some claim it is impossible. But before we dismiss it and retreat to lower expectations, we will do well to remind ourselves that at each historical stage of growth in schooling, large numbers of people believed the new aspirations to be impossible.

Just what *is* our new proficiency standard? Is it just more and "harder" content? Or is there some set of features that makes *proficient* performance different from *basic* in elementary and middle school as well as the end of high school?

There is, of course, an element of simply *knowing more* as one proceeds through the levels of schooling. So, for example, we expect elementary students to be able to manipulate fractions, but not equation sets. And we expect students to read texts of greater variety and complexity as they advance through the grades – stories and tales at third or fourth grade, science and history books in middle school, Shakespeare or multi-themed and complex novels by ninth grade. Some, but far from all, state standards specify grade-by-grade content in core subject matters (AFT 2006). A recent National Research Council report suggests that empirically derivable "learning progressions" for science concepts can be specified as a way of going beyond simple lists of topics to be covered (Duschl, Schweingruber & Shouse 2007).

However, sequences of topics and standards, no matter how carefully devised, do not by themselves distinguish between *basic* and *proficient* expectations. Teachers *translate* standards and sequences of topics into learning experiences for students, through the activities they create, the conversations they hold in class, and the criteria for high-quality work that they create and communicate to students; and research indicates that teachers (even within the same school) vary considerably in their ability to do this translation successfully (Matsumura et al. 2006;

Rowan, Correnti & Miller 2002; Sanders & Horne 1994; Spillane 2004).

At every grade – kindergarten through high school – there are ways of thinking and expressing oneself that are part of our new understanding of proficiency (Resnick & Hall 2001; Bransford, Brown & Cocking 1999). In order to successfully participate as adults in a postindustrial, technologically advanced, information-rich global economy, students need to master skills that represent the highest levels of Bloom's (1956) taxonomy.

Students need to be able to *evaluate* the information available to them through books, magazines, television, and the Internet for veracity and quality and to understand the viewpoints that inform its content (e.g., an author's purpose in writing a text, the messages communicated through the images used in an advertisement, the political motivations underlying an op ed piece). Students need to be able to *construct new knowledge* (organize, interpret, and synthesize prior knowledge) to solve complex problems that require new (and nuanced) solutions. Moreover, to be good problem-solvers students need to have *deep conceptual understanding* of the concepts, theories, and habits of thinking and inquiry that characterize the individual disciplines. Finally, students need to be able to *justify and explain their answers* using a range of symbol systems and forms of communication (e.g., through extended written responses, equations, graphs, dialogues, etc. – see Doyle 1988; Knapp, Shields & Turnbull 1995; Newmann, Lopez & Bryk 1998; Newmann, Bryk & Nagoaka 2001; Stein & Lane 1996; Wiggins 1990).

> What we today consider basic standards were at one time a challenging aspiration. Today we are aspiring to something much more challenging, a very high expectation that we have labeled *proficient*. And we want *everyone* to achieve it. This is historically unprecedented.

In contrast, basic skill levels represent the lower end of Bloom's taxonomy and are characterized by students' *recalling* facts (e.g., identifying the beginning, middle, and end of a story) and *applying a predetermined procedure* to solve a problem (e.g., using a fixed solution path to solve a mathematics problem). Unelaborated responses (e.g., short answers, assertions without evidence and justification, a single representation) also characterize a basic skill level.

The specific features of "proficient" and "basic" performance differ within the different disciplines. In the following sections, we show in more detail what it means to realize these performance levels in reading comprehension and mathematics – two areas that are a focus of many state and district reform efforts.

Reading Comprehension

Teaching students to comprehend texts is the central task of the elementary school curriculum. In the primary grades, proficiency standards for students focus mostly on mastering the print-sound code and developing fluency in reading relatively simple text. Beginning in the third (or fourth) grade, however, what it means to be a "proficient" reader shifts from decoding to inferring meaning from texts.

Specifically, as students matriculate through the grades, being proficient includes the ability to *evaluate* a text based on external criteria, *apply knowledge* from a text to solve a problem not mentioned in the text, and *analyze* a text into its constituent parts that are linked back to each other in new ways. Lower levels of proficiency – that is, basic levels of skill – are characterized, in contrast, by students only being able to *paraphrase* texts (summarize the basic events or facts from a text), *identify* information, and *retrieve* discrete facts (see Snow 2002).

To reach truly "proficient" standards, students need to be able to understand complex texts that contain nuanced information, build conceptual understanding, exhibit complexity in the language used and syntactic structures, and communicate effectively by writing extended responses that cogently set out and support a position and reflect the formal language of school and books.[1] This is in contrast to the short, unsupported responses that characterize "basic" levels of proficiency.

Consider, for example, the following examples of student work drawn from urban middle schools serving high numbers of minority students from low-income families. The first example represents (a high level of) proficiency. This student read Shakespeare's *Macbeth* and wrote a multiparagraph essay in response to the following prompt:

> What do you think is Macbeth's tragic flaw? In other words, what is the defect in his character or personality that causes him to do the things he does (murder the king, murder the guards, have his best friend and the family of another friend killed…) He is not a purely evil man, but a good man who has done horrible things. What is it about him that made him capable of such horrible deeds? Is there a lesson to be learned by the events in this play?

An excerpt of proficient student work[2] in response to this assignment is shown in Figure 1.

Ambition and Greed for Power…The Real Deal

Macbeth from William Shakespeare's tragedy *Macbeth* has some good overall character traits, such as bravery, thoughtfulness, and pride in his country. However, he has a tragic flaw in his character. He allows his actions to be easily manipulated by his ambition and his greed for power. At the beginning of the play people think he is very brave and good. By the end he is viewed as a tyrant by some, and a traitor by others, and there are still more who think he is evil.

"For brave Macbeth – well he deserves that name –." This quote from Act I Scene ii, shows that opinions about Macbeth are good in the beginning. Macbeth has killed Macdonwald, and defeated the forces of Cawdor, Both rebels, in battle. King Duncan is proud of Macbeth and has the present thane of Cawdor executed. Macbeth is made thane of Cawdor. Macbeth is proud that he has this new title. However he does not want the fame to end…

Figure 1. Excerpt from proficient-quality student essay

1 The formal language used in school is often referred to as *academic English* (see Bailey et al. 2004 for a detailed discussion of this type of language).

2 A sign of the high level of teaching and learning in this classroom is that the teacher considered the example to be of only medium quality!

A Short Summary	Questions	A Few Predictions
• Greg's father wanted him to get good grades. Because he was doing bad in math, his father told Greg that he could not play on the basketball team. So Greg went to an abandoned tenement. • Greg was threatened by a man in the tenement. He said his name was Lemon Brown. • The noise they hear are a couple of bad street men. They come in trying to get Lemon Brown's treasure, but Lemon fought them. • Lemon Brown showed Greg the treasure. It was a harmonica and newspaper clippings of him playing the piano.	• What is the treasure that he has? • What makes him such an important person to have a whole story named after him? • Is that Lemon Brown in the picture? • Why is the picture split into day and night? • Why is Lemon Brown talking with him? They don't know each other. • What is to happen to Lemon? • Will the thugs come back? • How was Jesse killed? • Did Lemon really think the clippings were worth the fight?	• I think the story is about a black man trying to survive in the city. • I think the black guy is a cool musician. He makes good money and isn't very old. • I think he lives in a very crowded area that has a lot of pollution. It is always busy and he wants to get away from the people. • I think Lemon Brown will begin again to sing the blues. Or else I think Greg will be the one singing and Lemon Brown will teach him.

Figure 2. Basic-quality student work in literature

This essay exemplifies the high standards for proficiency described earlier in the following ways.

- *Macbeth* is a very complex text in terms of language and content.
- The student *constructed new information* from the play to answer this prompt – by synthesizing the actions and events in the text, Macbeth's motivations for his deeds, and the logic he used to justify his actions – in order to arrive at the student's own conclusions concerning what Macbeth's tragic flaw was (rather than identifying an "answer" located in the text – the place where Shakespeare wrote, "Macbeth's tragic flaw was . . ."). Multiple interpretations and answers are possible to what Macbeth's tragic flaw is (so this is a "problem" where multiple "answers" are possible).
- The student wrote an extended response and supported his assertions with multiple examples from the play.

The example in Figure 2 of student work from a different class and teacher, in contrast, meets only a basic level of performance in seventh grade. The students were asked to read the short story "The Treasure of Lemon Brown" by Walter Myers (2000), complete a chart summarizing the main points of the story, generate questions about the text, and make "a few" predictions about what they thought would happen next. While making predictions and generating questions about the text are recommended strategies for teaching reading comprehension, the way in which these strategies were implemented in practice did not provide students with much of an opportunity to develop a deeper understanding of the text or further their interpretive capacities. As shown in Figure 2, a typical student[3] recalled only very basic facts about the story. Moreover, the chart he was asked to complete provided him with little space to develop, justify, or explain his responses.

3 The teacher who gave the assignment judged this student's work to be of high quality for the class.

Mathematics

As the future of our country's economic well-being and competitiveness in the global marketplace increasingly depends on advancing and developing new forms of technologies, notions of what it means to be "proficient" in mathematics are increasingly based in the skills and knowledge needed by engineers and scientists (Hiebert et al. 1997; Newmann, Lopez & Bryk 1998; Stein et al. 2000). In other words, for students to learn how to understand mathematics in ways that ready them for high economic and civic participation, they need the ability to successfully solve complex problems for which there is *not a single predetermined solution path*, to form *connections between mathematical concepts and representations*, and to use *multiple representations to communicate and justify* mathematical ideas and solution strategies (e.g., in writing, equations, graphs). In contrast, a basic level of proficiency is characterized by the application of a set procedure or algorithm – that is, the solving of problems for which there is a clear-cut, single solution (Stein et al. 2000; Doyle 1983).

Figures 3, 4, and 5 show examples of student work, again from urban middle schools, demonstrating proficient and basic performance standards. The first example (exemplifying a proficient, or high-level standard) is from a classroom where students worked, in groups, to find different methods for solving the following problem:

> Remember the Cookie Monster from Sesame Street, he is always eating all the cookies. The Cookie Monster has devised a plan for eating all the cookies. There are 12 cookies in the kitchen. On the first night the Cookie Monster sneaks into the kitchen and eats half the cookies. On the second night the Cookie Monster sneaks into the kitchen and eats half the remaining cookies. If this process continues, when will the Cookie Monster finish all the cookies? Use your algebra skills to justify your claim (draw a picture, make a table, make a graph, describe in words, find an equation).

One example of student work that we consider proficient appears in Figure 3.

Another student wrote, "It was the Cookie Monster problem. He will never eat all cookies because it will keep getting in infinity of decimals." He then drew a chart to illustrate the problem, shown in Figure 4.

> First, we made a table for the problem. Then we graphed it. We experimented with many different equations until we got the correct one, which was $y = 12 \div 2^x$. The other students in the class drew a picture, made a table, made a graph, did the Zero Product Property. We found out that the fraction of cookies left would be infinite, because $0 \div 2 = 0$, $2 \div 0$ = error, so nothing $\div$ 2 can equal zero, so the answer will never be zero. From the picture and graph we discovered that the difference was dramatic at first, and very small at the end. The equation was $y = 12 \div 2^x$ because there were 12 cookies originally, and for every night you divide the previous # of cookies by 2, so you have divided by 2 the number of days, or 2^x, if x is the number of days.

Figure 3. Example of proficient-quality student work

Day 0		12
Day 1	12 · ½ = 12/2	6
Day 2	6 · ½ = 6/2	3 = 3
Day 3	3 · ½ = 3/2	1½ = 1.5
Day 4	1½ · ½ = 1½/2	¾ = .75
Day 5	¾ · ½ = .375	.375
Day 6	.375 · .5 = .1875	.1875
Day 7	.1875 · .5 = .09375	.09375
Day 8	.09375 · .5 = .046875	.046875
~~Day 9~~		

Figure 4. Example of proficient-quality student work

These examples of student work exemplify the standards for proficiency described above in the following ways: First, students applied their knowledge of algebra to solve the problem, which was sufficiently open-ended that students could (and did) approach the problem from several different perspectives. Second, students used more than one representation to describe their answers (e.g., a written explanation, graph, equation, or table) and made an explicit connection between these representations (albeit with varying degrees of success).

In contrast, the following example of student work from a sixth-grade classroom represents a *basic* standard for mathematics performance. Here, students again worked in groups, but this time with one student in each group taking on the role of a waiter or waitress. After each student's "order" had been taken and recorded, students were given the following directions to proceed:

- Write down at least two items from each member of your group and the price amount.
- Add the total of the entire purchase.
- Include the 8 percent tax.
- Add the total and tax.
- Include a 15 percent or 20 percent tip.
- Add your final total.
- Show all the work.

Notions of what it means to be "proficient" in mathematics are increasingly based in the skills and knowledge needed by engineers and scientists.

Figure 5 shows an example of student work for this task.

Order Check
Larry's Lunch Place Food Order

Item	**Price**
Fish and chips	4.45
RBF	1.99
CT	4.50
IT	.80
RT	3.95
L	.99
CI	4.50
OJ	.99
Subtotal	$22.17
Tax 8%	+1.77
	23.94
Tip 15%	+3.59
	$27.53

Figure 5. Example of basic-quality student work

This example represents a "basic" level of proficiency because a single prescribed procedure was used to arrive at the answer. In a collection of work from this classroom, the samples of student work were identical – with variation only in the food items chosen. Moreover, the mathematical content (adding and calculation of percentages) needed to solve the problem was not difficult (i.e., does not add to the knowledge core students need to develop to solve complicated real-world mathematics problems).

Are some students being rated proficient for performances that are closer to our meaning of “basic”? And, most fundamentally, are some children not even being taught the kinds of skills and thinking processes that constitute proficient performance? Evidence indicates that the answer is “yes” to both questions.

Proficiency: A “Bright Line” Obscured

In summary, achieving a proficient standard for academic performance in twenty-first-century America means being able to solve non-routine tasks and effectively explain and justify one’s answers, using the symbol systems that are the standard for the discipline. Given this definition, and returning to the questions raised at the beginning of this paper, we ask again whether the country may be using a common word (proficiency) to mask important discrepancies in opportunities to learn and in judgments about the standards that children are meeting. Put more bluntly, are some students being rated proficient for performances that are closer to our meaning of “basic”? And, most fundamentally, are some children not even being taught the kinds of skills and thinking processes that constitute proficient performance? Evidence indicates that the answer is “yes” to both of these questions.

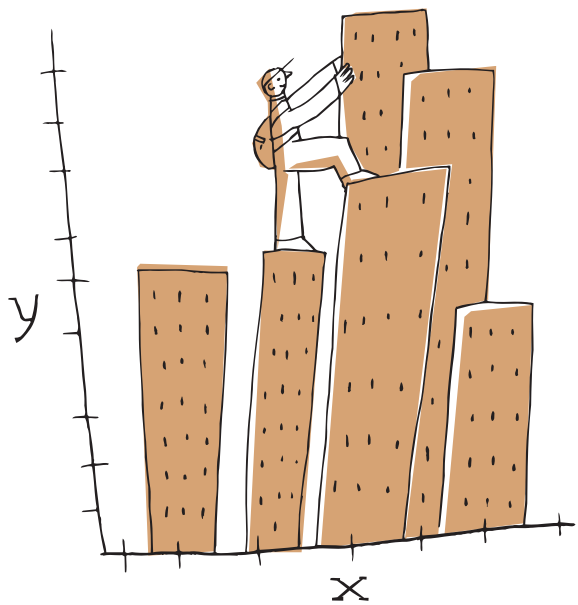
First, the No Child Left Behind Act, which has had an enormous influence on education practice, has encouraged wide state-by-state discrepancies in the definition of “proficiency.” Although the law required all students to demonstrate proficiency by a set date, 2014, the statute left it up to each state to define *proficiency*. The resulting definitions vary widely from one another and from the definition implied by the student work examples presented above.

These variations are evident in the discrepancies between the percentages of students who are proficient on state tests and the proportion proficient on the National Assessment of Educational Progress (NAEP) (see Peterson & Hess 2005). A few states’ accountability tests yield proficiency ratings that mirror those of the state on NAEP. Most yield proficiency rates significantly higher than NAEP's. This makes it easier for schools to meet the legal NCLB requirements, but simultaneously – because teachers target what they expect to be on the tests – makes it far less likely that students will receive assignments and teaching that call for truly proficient performances.

Underlying the mismatches between NAEP and state test scores are features of most of the state tests. Several studies (Linn 2000; Webb 1999; Wixson et al. 2002) have shown that most state tests do not align very well with their own standards, and that the misalignment is systematic: the high-cognitive-demand items that call for truly proficient performances are underrepresented in the tests, while basic-level items are overrepresented (Resnick et al. 2003). As a result, students can be judged "proficient" even though they have not demonstrated the challenging abilities state standards suggest are necessary for all students.

The way in which cut scores are established for state tests further contributes to the confusion. A *proficient* rating typically calls for answering a certain number of test items correctly, without reference to which items. In many tests it is possible to accumulate enough points for a *proficient* score while attempting few, if any, items that would be judged to truly call for proficient thinking.

As a result of these practices, the bright line that separates basic performance from truly proficient is, at best, blurred. The nation can profess a goal of proficiency for all, while in practice expecting only a basic level of performance from many.



Directions for the Future

How might we refocus the education reform enterprise on students' attaining *true academic proficiency* – that is, children learning at every grade the content and skills they will need to be successful, empowered citizens in contemporary society?

One obvious answer would be to cease the practice of allowing state standards and tests to miss the true proficiency mark. There are various ways in which this could be approached. One approach would involve statistical linking of state test scores to the performance of the state's students on NAEP and establishing incentives for states to bring their own tests into better alignment with the national assessment. Another possibility would be to establish a national (not necessarily federal) board to review and approve state standards and tests. This would work best if there were nationally adopted model standards and assessments to illustrate what the states needed to work toward.

> With a more streamlined process that brought costs of assessment down, it might be easier to include more high-cognitive-demand, truly "proficient" items in our assessments. We could lower assessment costs and equalize standards by allowing states to use the national model standards and assessments.

These are both possible solutions, but they maintain the current expensive process of developing dozens of separate state accountability systems. With a more streamlined process that brought costs of assessment down, it might be easier to include more high-cognitive-demand, truly "proficient" items in our assessments. We could lower assessment costs and, at the same time, equalize standards by allowing states to actually use the national model standards and assessments rather than develop their own.

Of course, any of these options represents a departure from our current tradition of state and local dominion over the content of what students learn. Yet if achieving true student proficiency is being sacrificed, as evidence suggests is the case, perhaps it is time to reconsider this tradition and work toward a system that truly leaves no child behind in the pursuit of academic proficiency.

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Integrating Text in Content-Area Classes: Better Supports for Teachers and Students

Louis Gomez, Phillip Herman, and Kimberley Gomez

An effort to help teachers and students link texts to science content demonstrates that young people who are purportedly far behind in reading ability can demonstrate high levels of knowledge and skill.

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It has become commonplace to read in the popular press that in the United States we are living in a knowledge economy – that we have largely left the industrial economy behind. It is easy to find scholars, policy-makers, journalists, and politicians who are willing to make pronouncements like these. Educational pundits quickly follow with exhortations to make schooling different for the knowledge age. The upshot of these claims is that to become proficient and capable adults, today's students need different educational experiences. We need, they say, new approaches to teaching and learning that prepare people for the twenty-first century.

How, concretely, should instruction be different? No doubt, the list is long. In this essay we will discuss how an important classroom practice – reading and the role of text in content-area instruction – can change to better address these twenty-first-century realities. In what follows, we argue that reading content-area texts is a critical component in the development of twenty-first-century skills. The ability to read complex content text, such as science texts, is an important predictor of college and work readiness (ACT 2006). While the context of our work has been supporting reading in science, we conjecture that what we have learned about reading in science has broad applicability across the content areas (e.g., math, social sciences, history) of middle and high school instruction.

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Reading to Learn Science

There is no shortage of attention in current school policy discussions to topics such as "reading in the content areas," "adolescent literacy," or "developing every teacher as a teacher of reading." Though such catchphrases and their associated programs in schools have proliferated, substantially improving reading proficiency remains challenging (ACT 2006).

We believe that many of these efforts fall short because they do not adequately account for the ways in which teachers and students use and learn from texts in content domains. Reading is a highly contextualized activity that is likely to improve only when the purpose of reading is deeply coupled to content-area learning goals. To construct such reading environments in content-area classes will require that students and teachers be supported in novel ways.

Why give texts such a prominent role in content-area instruction? An information society requires highly proficient communicators. A highly proficient communicator is able to negotiate and communicate about rich complexes of rapidly changing ideas (Hargreaves 2003). Reading is central to this activity. Reading, in the sense we wish to discuss it, is more than the simple act of decoding. It is also vastly different than the ability to identify ideas in text and to copy those ideas in answer to some questions about a text. Reading, as described by Reader Response theorists (e.g., Rosenblatt 1978; Fish 1970), is, rather, more like a conversation of discovery, critique, and problem solving.

While much of Reader Response theory is about the dynamics of coming to terms with narrative texts, we believe this perspective can help us understand how readers interact with expository texts like those in science class. Learning with text in a domain is more than just acquiring a set of facts – it should also require learners to confront the pragmatics and social contexts of domains of inquiry. For science learning to be richly authentic in schools, text must be central. Text provides a unique way into developing an understanding of science as an activity situated in a context of beliefs, activities, and values. For example, appreciating how and why science values argument, evidence, and data can be hidden if all students carry out "cookie cutter" labs decoupled from textual inquiry that provides access to the greater context of scientific investigation (Palincsar & Magnusson 2001).

In this paper, we describe our initial efforts to support deeper coupling of content-area reading to science instruction. Specifically, we describe an ongoing program that includes teacher professional development, reading-support tools for teachers and students, and research designed to iteratively improve both the professional development and use of the support tools. This work is in the service of helping teachers make sophisticated pedagogical decisions concerning text. Ultimately, our goal is to improve science and reading achievement by helping teachers understand that grappling with text is not an "optional" activity in science class that is best assigned for homework, but rather a primary learning context for students to develop communicative competence.

Science learning and reading to learn are addressed as relatively separate phenomena. By not leveraging the opportunities that text provides for all students to deeply engage in scientific reasoning, teachers may not be adequately supporting the development of expert thinkers in science.

The failure to actively link text to content instruction has, in all likelihood, several underlying causes. We will highlight one possible cause. In the next sections, we describe how one common perspective on reading, which we label "threshold reasoning" about reading, can act as a roadblock to improving students' science learning with text. We then describe a program of work designed to better couple science learning to activities with text.

Threshold Reasoning: "They should have learned that before they got here."

In our experience in schools, we have found that high school science teachers frequently report being dissatisfied with the prior learning of their students. These teachers sometimes attribute low student performance in part to a failure of elementary and middle grades teachers to adequately prepare students for the rigors of high school learning. Though these teachers note that their students are not well prepared in terms of background science-content knowledge, an equally important concern is that their students "can't read well enough to learn science," as one teacher put it. This belief – that students are unprepared to learn science because of deficits in prior literacy preparation – has important consequences for content-area instruction in high school.

Teachers who believe students are unprepared for ambitious science learning because of prior literacy deficits may be reifying a perspective on the role of reading in learning that is counterproductive in terms of supporting ambitious instruction in content-area domains. Specifically, we argue that teachers with this perspective may be explicitly or implicitly endorsing a "threshold" or hierarchical model of reading proficiency. In this model, students need to reach or surpass some threshold in terms of application of relatively decontextualized reading skills (comprehension, vocabulary, decoding, etc.), below which students are unable to learn from text and above which they are ready to learn the kind of ambitious content-area work that high schools require.

There are a number of consequences that follow from this threshold perspective. If students are below the threshold, teachers may be tempted to believe that they cannot adequately support the literacy work of such students, given their need to "get to the science." Spending more time on literacy support may seem like a waste of time. Another consequence of this perspective is the subtle disconnect for teachers between science learning and students' facility with text. Because science learning and reading to learn are addressed, with few exceptions (Gomez & Gomez 2006; Cervetti et al. 2005), as relatively separate phenomena, it becomes more likely that text and science learning will not be closely entwined in the pedagogical decision making of teachers. Text becomes a barrier to science instruction instead of a critical component of the work that students need to do in science. By not leveraging the opportunities that text provides for all students to deeply engage in scientific reasoning, teachers may not be adequately supporting the development of expert thinkers in science.

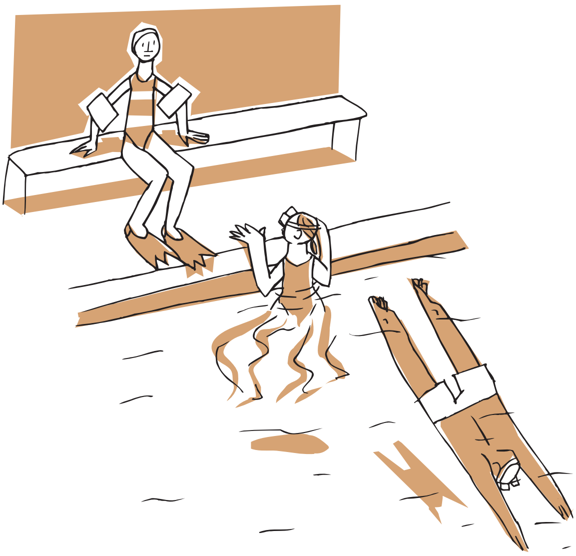
We contrast this "threshold" model of reading with an integrated approach that more closely ties the learning goals in the content domain to teachers' pedagogical decisions around texts. In this integrated model, students read science texts to engage in science work. Students, regardless of prior reading ability, need to work with texts in the service of ambitious science learning. Text in this model also provides a way for students to deeply reflect on the ways in which science (as revealed through text) differs from, say, mathematics. Just as grappling with data and hands-on activities are an ongoing aspect of deepening one's expertise in science, so, too, is developing science communicative competence through text.

Integrating Text in Science

Based on this integrated model of reading to learn, we have designed a literacy intervention intended to support changes in teachers' beliefs about literacy in science and their pedagogical decisions about the use of text in science learning.

During the 2005-2006 school year, we piloted the program in one neighborhood Chicago high school. The primary goal was to support teachers and students in their use of texts in ninth-grade environmental science classrooms.

Lopez High School (a pseudonym) is a large inner-city high school that serves 2,100 students. Approximately 90 percent of the student body is considered low income. More than four-fifths of the student population is Hispanic; 11.1 percent of the student body is designated as limited English proficient. In 2005, students' performance on a ninth-grade reading comprehension measure, Degrees of Reading Power, indicated that of the 450 ninth-graders tested, more than 300 students



had independent reading comprehension levels that were two or more years below grade level.

For our study, teachers and students implemented a yearlong, inquiry-based curriculum that requires students to think deeply about environmental science in their lives by focusing students on the processes that communities confront when they have to make complicated decisions about, for example, the best location for a new school that will be built in the habitat of an endangered species.

Three teachers and 330 of their students worked with our research team to better integrate text in learning. Our program includes professional development for teachers; literacy tools for teachers and students; and ongoing research that focuses on teachers' pedagogical decisions, students' use of the tools, student performance in science, student growth in reading achievement, and observations of classroom interactions around science texts. The program is intended to keep visible the interplay between acquiring content knowledge and reading-to-learn skills in highly contextualized learning environments.

We have introduced several reading-to-learn support tools into these classrooms. Our goal is an intensive reading-in-science infusion that provides students with tools to support the development of skills that are necessary for expert thinking and complex communication. We have a simple guiding principle: "Start with the science." We attempt to show how and why each text in a curriculum serves a science purpose. We start with a three-step, text-content integration process. First, we assemble a team of teachers who have experience using the curriculum. Second, we determine the instructional role that each text associated with curriculum serves. Third, we determine an instructional approach to bring each text into instruction (Gomez et al., forthcoming).

A suite of reading-to-learn elements supports this integration process, including the following elements:

- *Annotation system* is a set of text mark-ups that readers use to identify key text elements like transitions, arguments, and evidence.
- *Double-entry reading logs* are T-charts that direct readers to reflect about text elements they find confusing and describe why they are confusing.

- *Summarization* is used as a means to synthesize and report on the gist of texts.
- *Data analysis* helps in the examination and summarization of individual and collective elements of charts, graphs, and tables.
- *Considerate text sets* are deeply infused with literacy strategies and recommendations for supporting teaching and learning.
- *Pacing guides* contain detailed concrete suggestions about how to couple tools (e.g., annotation) to specific points in instruction and why.
- Periodic *professional development* allows teachers who are engaged in this work to meet throughout the year to discuss enactment experiences, compare student work, and refine assessment and implementation materials.

The overarching goal of these program elements is to make more visible the interplay between text structure (how information is represented) and text content to learners across a wide spectrum of reading levels. Each element of our program of work is designed to support knowledge transformation in which text information is actively reworked to improve learners' understanding. This is accomplished through support for individual reflection and reorganization. Through the use of the tools, we believe that learners develop an interconnected understanding of science concepts and the scientific procedures (questioning, documenting, analyzing, reporting) that help students gain deeper understandings of the concepts.

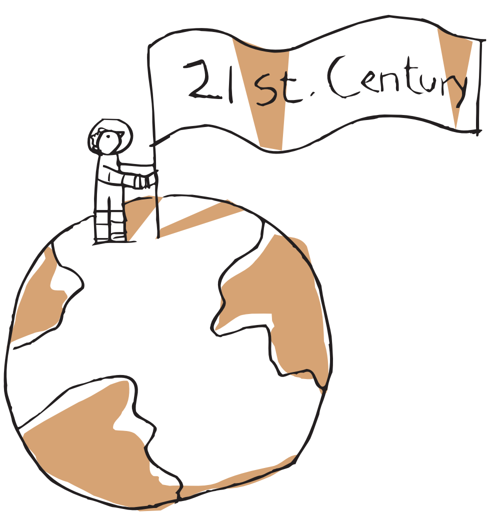
Lessons from the Pilot Year

Based on our initial analysis of data from the pilot year, we are confident that there is a real need to provide students with better opportunities to engage in purposeful reading in science. In interviews, teachers report that prior to the intervention, they frequently felt that students' ability to read texts was either beyond their purview or simply an insurmountable problem. That is, they report that given the pressure to cover science content and the general difficulty of supporting students as they transition from middle-grades science to high school science, there is little they can do to improve student facility with texts.

We are confident that there is a real need to provide students with better opportunities to engage in purposeful reading in science.

Also, they report that they have had little or no explicit training in supporting literacy in science contexts. This is worth noting. Even for teachers who might be inclined to meaningfully support the use of texts in science, many simply have no repertoire of strategies to access and, instead, rely on general impressions and instincts about what their students need (Gomez & Madda 2005).

In the past, schoolwide literacy campaigns have provided teachers with their primary exposure to ways of supporting students' reading of texts. However, those literacy strategies were "top down" from the school and decontextualized from teachers' learning goals that are tied to specific curricula (and texts). Such general strategies might be similar in appearance to the tools that we introduced in the intervention, but they differ critically in that they are not deeply coupled to the work of students and teachers in science. By and large, absent this coupling, these strategies are meant to help students merely process text. When deeply coupled to the content and to the act of teaching, these strategies are more likely to expose underlying aspects of the doing of science. In short, they may open a window to help teachers improve their pedagogical content knowledge that is focused at the intersection of science learning and textual understanding.



We believe that what is different about what we do with teachers is that this coupling takes classroom instruction some way down the road to helping teachers and students see the inseparability of text and reading and content understanding. In many ways, we think today's instructional landscape pays lip service to reading in the content areas but does not offer a set of concrete strategies to allow both teachers and students to develop an appreciation for this coupling that is actionable.

We are convinced that the threshold view of reading needs to be highlighted and, ultimately, challenged so teachers can begin to show some ownership of the problem of supporting students in meaningful inquiry with text. We cannot wait until all students reach some arbitrary level of proficiency or threshold before we start teaching them science. Texts cannot and should not be avoided. Teachers report that two of the most common practices they have used in the past when students did not understand a science text were to tell them to "read it again" or that teachers would read the text aloud to students as a whole-class activity. Content-area teachers need an effective repertoire of strategies and tools to support students as they leverage text to become more expert in science. To accomplish this, teachers need ongoing, practice-based professional development that helps them understand what they believe about text in science learning and supports them as they try to change their practice to more closely intertwine text in their plans for student development in science. They also need time and support to use literacy tools in their science classes.

Students also need to recognize the purpose of reading texts. The purposes need to be clearly related to important science learning goals. It was not clear in our work if students consistently recognized the science learning goals associated with reading texts. It is likely that such an awareness by students will lag behind a teacher's own effort to clarify for him- or herself the ways in which the texts can best be leveraged.

Readers for the Twenty-first Century

We began this essay with concern about twenty-first-century skills. In closing, we return with a brief comment about reading and twenty-first-century skills. Frank Levy and Richard Murnane (2004) suggest that the lion's share of jobs for the foreseeable future will require what they call *expert thinking* and *complex communication*. As the century unfolds, workplaces will require fewer workers that do strictly structured and rule-governed tasks in which they have little latitude for decision making, restricted reporting, and limited collaborating spheres. Increasingly, employees from entry level to leadership roles will be expected to do the thinking, documenting, and communicating necessary to sustain and grow their organizations (Levy & Murnane 2004; U.S. Dept. of Labor 2006).

We believe that among the most important places to prepare these workers are content-area classrooms in science, math, history, and other intellectual domains. The specific content that is the centerpiece of these courses of study is surely important to success in this new century. However, here we want to underscore that helping students become the kind of readers who use text to confront and appreciate the social and pragmatic landscape of problem domains will help them be productive, proficient, and capable citizens.

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The Investigators Club: An Alternative to Textbook Science

Richard Sohmer
and Sarah Michaels

By drawing on the knowledge students bring to school about the world, the Investigators Club enables middle school students to understand complex physics theories.

Students come to class with well-developed theories of how the world works. Students are already dedicated and successful investigators of the physical world: they know how to jump out of the way of an oncoming bus, transfer liquids, move heavy or clumsy objects around, and deal with friction and force. They have theories (largely implicit) of invisible causes (suction, heat, pressure, gravity) underlying apparent effects in their environments.

The way science is typically taught in schools –"textbook science"– deprecates students' already-existing knowledge. On the one hand, the extent, complexity, and workaday utility of student knowledge are rarely appreciated. On the other hand, even when student knowledge *is* taken into account, it is likely to be framed as a pernicious snarl of *misconceptions* – useless impedimenta that are to be extracted and replaced by canonical prosthetics (think dentures!).

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The Investigators Club

Over the past ten years, the Investigators Club (I-Club) – a research-based science program – has sought to bridge the gap between what students know from the world and what they are taught in school as "science." The I-Club has been used in a variety of after-school and in-school settings. In its original design, the I-Club program is an after-school program with a central focus on teaching and learning science, meeting three times a week with students from a wide range of cultural and linguistic backgrounds, predominantly low–socio-economic-status students who are struggling or failing in school.[1]

1 As a design and research site, the program has been supported over the past ten years by foundations (Spencer and Davis foundations), federal grants (Eisenhower), and schools and school districts (e.g., Springfield [Massachusetts] Public Schools; a number of middle schools in Massachusetts [Sullivan Middle School, Worcester East Middle]; the Denali Montessori Elementary School in Anchorage, Alaska; the Navajo Immersion School in Window Rock, Arizona).

For more information on the Investigators Club and to learn about and explore the "Two Puppies" story, visit the www.InvestigatorsClub.com Web site.

It has since been expanded to include an in-school program in middle schools, as well as a pre-kindergarten curriculum that is currently being piloted. In-school programs provide support for teachers to adapt the curriculum to meet their curriculum frameworks and standards. In this report, we highlight activities from the fifteen-week after-school program, but all the activities described have been used in schools by practicing teachers.

In the after-school programs, students were recruited as volunteers. There are no special tests or grade requirements to get into the program, just a commitment to come regularly and work hard. Most of the students start out with low or failing grades in school but say that they are "interested in doing cool things in science." As a condition of membership, students sign a simple contract. They agree to be "respectful to one another" and to "discover, practice, and acquire the skills of scientific investigation." In three separate semester-long sessions funded by a major grant from the Spencer Foundation, I-Club volunteers were matched (by gender, SES, and ethnicity), and then randomly assigned to either the I-Club (meeting three days a week after-school) or an in-school "science club" that met three times during the semester. All I-Club teachers were hired, trained, and mentored by the I-Club director, Richard Sohmer. In-school teachers using the I-Club program were all certified at the preschool, elementary, or middle school levels.

Unlike traditional school science, the I-Club makes use of students' everyday ways of speaking about the world while gradually scaffolding the students into the use of new discursive tools (new ways of giving scientific explanations and using representational tools). In this program, the activities ("tasks" or "demos") are designed to promote active theorizing, prediction, and argument about puzzling physical phenomena, often called *discrepant events*.

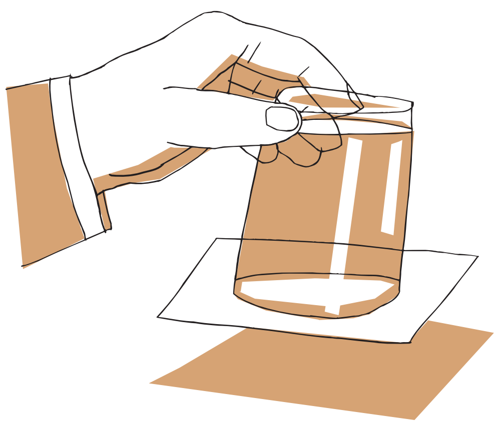
Having a well-argued theory is the name of the game. If a student's prediction or theory (or both) are, in the end, disconfirmed by the evidence, that is OK; the job of the scientist is to make cogent predictions and theories, so that they may be cogently confirmed or disconfirmed. The goal, then, is to make one's claim as explicit and persuasive as possible. Everyone benefits from seeing the best theory prevail against the field of contesting, arguably possible – though, ultimately, less effective – theories, and everyone can and is expected to appropriate the results in their consideration of the next demo.

Modeling How Scientists Talk, Think, and Act

As they analyze and explain contesting predictions and theories about physical events they observe together (*doing* physics), the I-Club students are scaffolded toward the "Discourse" of physics, which is not anybody's *primary* discourse.[2] For instance, most people see, use, and accept "suction" as a perfectly adequate explanation of ordinary

2 Gee's notion of a "Discourse" (with a capital *D*) (Gee 1989; 1992; 1996) refers to the ways in which people align language with ways of acting, interacting, thinking, valuing, and feeling, as well as ways of coordinating (and getting coordinated by) people, objects, tools, and technologies, so as to display different socially situated identities. We are all members of many Discourses – sometimes compatible, sometimes conflicting.

actions like using a vacuum cleaner to clean a carpet or drinking a milkshake through a straw. An ordinary person who doesn't know much physics sees *sucking* (or, what sounds more scientific, a "vacuum") at work upon observing a person drinking a milkshake through a straw. A physicist, in contrast, sees *pushing*. The actual forces of pulling and pushing are both invisible, but practitioners of physics see pushing – atmospheric pressure pushing the milkshake up into the straw. (The demo on this page of the glass of water demonstrates this principle.)



One of the first demos that Investigators take home to show and explain to their families. Fill a glass with water, cover it with a piece of paper, and then turn the glass of water upside down: the water does not fall out! What makes this happen?

In the process of doing science, the I-Club participants take on a new identity ("Science Investigator" is how the students refer to each other) – which does not conflict with their current understanding and ways of speaking. Indeed, this new identity actually builds upon (and transforms) their current understandings as the basis for new ways with words and new ways of "seeing" the world. This article describes some examples of I-Club demos that have proven to be productive as shared theorizable situations.

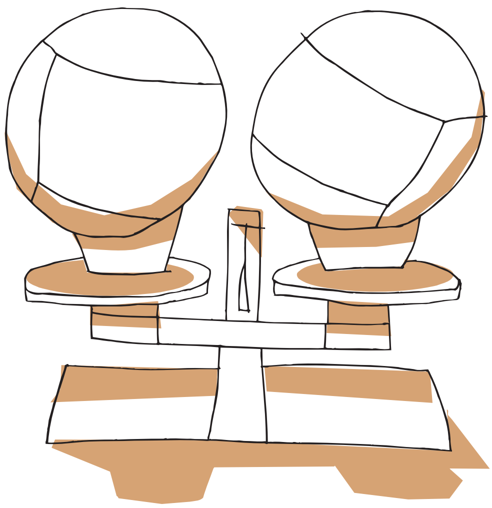
Investigators Club activities are embedded in a set of participant structures and expectations that model the way scientists actually talk, think, and act. In "Circle-up Time," the central event of the day in the I-Club, students engage in a powerful whole-group talk format that we have come to characterize as a "position-driven discussion."[3] Here, students focus on a single problem or question – embodied in a discrepant-event demo assembled from everyday or hardware-store components – with multiple, arguably possible, outcomes.

3 Similar approaches in the U.S. include Jim Minstrell's (1989) program in high school physics and Eric Mazur's (1996) approach to college-level physics, referred to as the "Peer Instruction" approach. Each of these programs puts central emphasis on teacher-led, position-driven discussion with active student theorizing, debating, and voting for candidate positions. This kind of group discussion also bears a striking resemblance to work in some constructivist mathematics pedagogies that center on group discussion of a single problem (e.g., Lampert & Ball 1998; Cobb, Wood, & Yackel 1993; O'Connor 2001). This approach to whole-group discussion around a single, rich "mathematizable situation" is also common in Japanese math classes (as described by Stigler & Hiebert 1999 and demonstrated in the Third International Mathematics and Science Study (TIMSS) videotape of Japanese eighth-grade lessons in geometry and algebra).

Everyone is encouraged – indeed, at strategic points in the debate, required – to commit to one position or another and to argue for their respective predictions or theories. Participants are free to change their position on the basis of another's evidence or arguments, with the proviso that they explain what it is in the other's position that they find useful or persuasive.

A New Role for Teachers: Revoicing, not Providing "Right" Answers

With rare exceptions, the I-Club teacher's job is not to provide "right answers" during position-driven discussions. "Telegraphing" (indicating in any way) which theory is closest to being canonically correct inhibits position-driven discussions. Instead, the teacher scaffolds students by "revoicing"[4] their contributions, pushing for clarification, so that everyone has access to everyone else's reasoning. The teacher might say, "OK, so let me see if I've got your theory right. Are you saying that the volleyball will weigh less [when we put more air into it] because a balloon falls slower



A Circle-up problem: The two volleyballs balance on the scale, initially. When one of them (the one on the right, say) gets more air – ten bicycle pumpfuls – put into it, what will be the result? Will the volleyball on the right go up? Go down? Stay balanced?

4 O'Connor and Michaels (1993; 1996) have characterized "revoicing" moves in great detail, showing how they work to align students with other students, with the teacher, with others' ideas, and with disciplinary knowledge. Characteristically, a revoicing move has several component parts: a student's contribution; the teacher's attempt to clarify or rebroadcast the student's idea, using some marker of a warranted inference and a verb of speaking or thinking (such as "so, you're saying" or "let me see if I've got your thinking right"); the rephrased, expanded, clarified contribution; and an opportunity for the student being revoiced to assent or dissent from the teacher's revoicing. This move thus positions the teacher and student on equal footing, rather than putting the teacher in the role of evaluator, while at the same time crediting the student as a thinker or theorizer with the revoiced utterance. This simple revoicing move thus positions students differently (and socializes students differently) from the standard Initiation-Response-Evaluation pattern characteristic of much teacher-student talk in school.

Productive Talk: Six Good Talk Moves

Revoicing
"So let me see if I've got your thinking right. You're saying, '____'?" (with space for student to follow up)

Who can repeat?
"Can you repeat what he just said in your own words?"

Agree/disagree?
"Do you agree or disagree, and why?"

Bringing new students into the conversation
"Would someone like to add on? Would someone like to build on Jamal's idea?"

Asking students to explain their reasoning
"Why do you think that?" or "How did you arrive at that answer?" or "Say more about that."

Wait time
"Take your time . . . we'll wait."

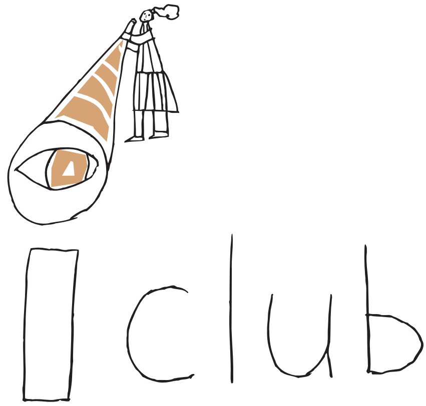
when it's full of air?" The teacher revoices to help the student construct the claim, prediction, and theory the student envisions and is struggling to put into words. Perceiving that the teacher is exerting his or her skill in their service, students respond forthrightly to skillful revoicing, with responses running the gamut from "No, that's not what I said" to "Yeah, that's it" to "Yeah, but I also want to say..." and everything in between.

Getting teachers to use revoicing without "editorializing" on the correctness or likelihood of the student's claim has turned out to be a tougher job than we anticipated. Part of the difficulty is that revoicing runs counter to the received model of "teacher equals provider and enforcer of right answers." Another part of the problem is that revoicing requires the teacher to sustain a very high level of awareness and self-discipline, because there is little or no margin for error. Students cannot ignore correctness cues from teachers; when the teacher emits one – as happens inadvertently, on occasion, even to skilled revoicers – the students' investigations are summarily terminated. Learning to revoice as a matter of habit is like learning to read X-rays or learning to ride a bicycle. Initially, it seems to entail rude halts, crashes, and scrapes. With repeated attempts and the observation of others' successful performances, however, one "gets the hang of it" – and can go places and do things easily that were previously inaccessible and impossible.

Revoicing and similar discussion-facilitating skills (see sidebar on "productive talk") are critical in the Investigators Club practice because having multiple, "sayable" theories (positions, predictions) is more important for student discussion and real learning than a premature arrival at the right theory. Only when all predictions and theories have been put on the table in their strong forms, with evidence and arguments marshaled in their support, is the demo allowed to run its course. Nature (from the Greek *physis,* from which *physics* is derived) speaks and settles the argument. At that point, the teacher's role is to facilitate the debriefing process. What happened? What have we learned? What's still undetermined, unknown, ambiguous?

What approach(es) to the problem was (were) fruitful? Even here, the teacher is primarily a coach,[5] whose job is *not* to bludgeon the students *out* of their home-based knowledge and the theories implicit in that knowledge, but rather to help them explicate, clarify, and sharpen their theories – providing the field of competing ideas against which more effective, more canonical ideas figure as motivated matters of personal importance.

In the I-Club, where the teacher's goal is to facilitate a genuinely position-driven discussion, heterogeneity of students' experience and cultural background is a valuable resource. I-Club students ("Investigators") use their diverse, culturally derived, everyday ways of speaking about discrepant events involving everyday objects (balloons, soda cans, drinking glasses, candles, water, fire, etc.). But the realities to which they refer are subject to the laws of physics, which are the same across cultures. When the group evaluates competing theories in their most persuasive forms in the shared context of the demo at hand, cognitive growth in the form of movement toward more effective and canonical ways of seeing and talking is self-motivated and self-enhancing, grounded in and assimilated to experience, and driven by the desire to know and make things happen in the world, rather than by a concern for the "right" answer.



Where the teacher's goal is to facilitate a genuinely position-driven discussion, heterogeneity of students' experience and cultural background is a valuable resource.

Evidence of Significant Results

From a variety of perspectives and using a number of indicators, we have been able to show that students who were failing in school became capable, in the course of participation in I-Club activities, of demonstrating impressive intellectual abilities – in understanding and theorizing difficult problems in physics and in demonstrating that understanding to others. Evidence includes, but is not limited to: pre- and post-tests of science knowledge; questionnaires of I-Club students and matched controls' motivation, participation, and sense of efficacy in school;

5 One component of being a good coach – able to support, scaffold, expand, or unpack the culturally specific ways with words that students bring – is domain-specific knowledge. The I-Club practice is an apprenticeship; it does not require that either students or teachers begin with the skills that the practice is designed to develop. The I-Club "Circle-up" activities and, crucially, the demos on which they center, are designed to be sites for teacher learning, so that teachers, as they enact them, will themselves be scaffolded into a deeper understanding of physics.

These results show that the I-Club was successful in creating positive changes that were evident even *outside* of the I-Club setting.

teacher judgments of students in school; Investigators' successful participation in the school science fair; and Investigators' demonstrated ability to present, conduct discussions about, and teach the physics of air pressure to younger (fifth-grade) students.

We have both quantitative and qualitative evidence that these students did in fact come to take on expanded identities as "Science Investigators." They participated as effective members of a specific Discourse, the Investigators Club, which embodies skills, attitudes, and knowledge valued by the Discourses of science and school. We can also show that the I-Club Discourse did not resonate with their previous negative experiences in school and that it consisted of practices that allowed these students to voluntarily acquire and demonstrate competence in knowledge, skills, and attitudes valued in scientific contexts (and schools).[6]

We also assessed changes in students' scientific reasoning. Repeated analyses showed that I-Club students increased in the complexity of their responses over time relative to control children, who decreased. I-Club students were less likely than control participants to use anthropomorphic or volitional causes ("the fire wanted to escape from the bottle and so it sucked the egg in") as explanatory devices.

Our studies of the motivational structure and impact of the I-Club have

6 We assess the language use and development of scientific explanations over time from videotapes of all I-Club sessions (coding participation structures and individual participation and looking closely at transcripts), but we also administer pre- and post-tests of science learning (multiple-choice and open-ended answers). We make extensive use of self-report questionnaire data – about motivation, academic efficacy, and engagement – after each session of the I-Club and administer general questionnaire surveys about school, home, academic efficacy, theories of intelligence, parents, and teachers twice a year. We have questionnaire data about how the students perform in school from their teachers. We have a randomized, matched control group for all I-Club students and we follow all of the students over two years after their I-Club semester to assess both durability and transportability of I-Club effects. As mentioned above, this more controlled, longitudinal study includes three different cohorts of I-Club/controls, taught by three different I-Club teachers.

also demonstrated significant results. Relative to their matched controls, the I-Club participants increased more from pre- to post-assessments in school engagement and learning orientation (working to actually learn something rather than just to look smart) and decreased more from pre- to post-assessment in their performance orientation and external motivation for school (doing schoolwork just to look smart or because they "have to"). Further, the I-Club students described their teachers and parents as more supportive of their autonomy over time relative to the controls (an interesting and unexpected result). These results show that the I-Club was successful in creating positive changes that were evident even *outside* of the I-Club setting.

Strategic Use of Explanatory Tools

At strategic points – when experience has demonstrated its effectiveness and when it would be unproductive to demand that students "reinvent the wheel" – the I-Club teacher provides new "explanatory tools," often in the form of analogies and narratives. The "Two Puppies" story (Sohmer & Michaels 2005), for example, is a narrative form of the Ideal Gas Law. In the "Two Puppies" story,[7] the "puppies" referred to are mythical or fictional beings – "air puppies" – combining *some* of the properties of real puppies with the behavioral characteristics of the molecules that make up air. The air puppies are the bumbling (mindless) agents in a modifiable story with a particular setting (always including two rooms separated by a moveable wall-on-wheels), participating in a series of events, always resulting in some kind of lawful effect – that is, the wall moves as it *must*, given the air puppies' opposing impacts upon both sides.

We typically introduce the air puppies story to the students in a ten- to twenty-minute session by telling them the basic story, followed – always – by several variations. As the story progresses, the situation and changes in it are illustrated with simple, freehand drawings (on whiteboard, paper, or chalkboard). We begin by asking the students to imagine a big room divided into two smaller rooms by a wall on frictionless wheels (like roller skates). In each of the rooms on either side of the wall-on-wheels there are air puppies – initially, equal numbers and kinds – mindlessly bumbling around.

7 "Two Puppies" is the abbreviated name for an otherwise impossibly clumsy story title: "The room that's been divided by a moveable wall-on-wheels into two rooms in each of which there is a group of constantly bumbling-around 'air puppies,' so that there is always a pushing match going on between the *two* sets of *puppies,* even though the puppies are never thinking about anything, never trying to do anything, and never even aware of anything at all."

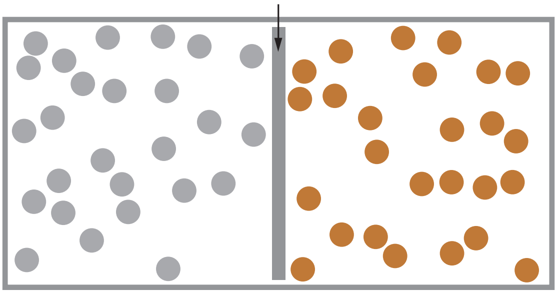


Figure 1
The view from above of the beginning of the "Two Puppies" story. In this version of the story, there are equal numbers and kinds of air puppies on each side of the wall-on-wheels.

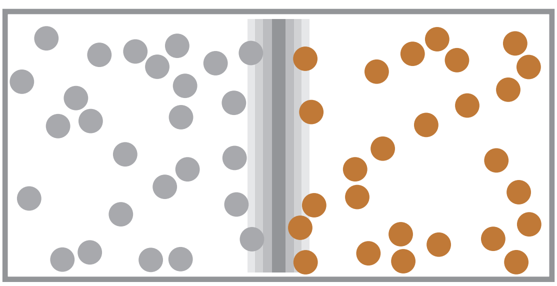


Figure 2
With equal numbers and kinds of air puppies on each side, the wall-on-wheels is continually bumped from side to side. The net impact of the puppies on one side of the wall-on-wheels is, on average, equal to the net impact of the puppies on the other side, making the wall oscillate about the centerline.

(Figure 1 shows a top-down view of the situation.) The dividing wall-on-wheels moves[8] whenever a puppy bumps into it (not intentionally, just mindlessly moving around). As the puppies bumble around and mindlessly bump into things (all the walls and each other), "What," we ask the students, "will happen to the wall?" In this first session, one or more students will confidently "read" the situation to predict that "the wall will stay in the same place."

Once the scenario in Figure 1 is set in motion the wall-on-wheels (or, as the students refer to it, the "wall") is pushed a little bit to one side or the other each time a puppy bumps into it. Because the wall gets, on average, the same number and kind of bumps from each side, the wall stays over time in approximately the same place, oscillating about the centerline (Figure 2).

A number of variations on this basic story are possible.

Variation 1
Storyteller: "What if we start out with the same number of air puppies – twenty – on *this* [e.g., right-hand] side

8 The wall-on-wheels can move to the left or to the right, but is constrained so that it always maintains its orientation perpendicular to the long walls of the room.

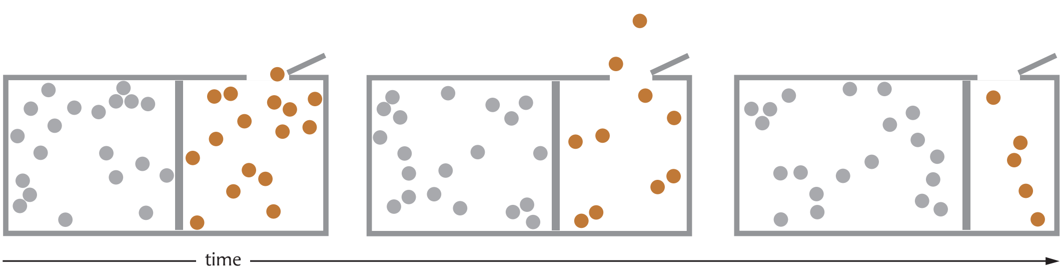


Figure 3
Three views as time progresses. As air puppies in the right room "bumble" out the open door, there are fewer and fewer air-puppy impacts from the right upon the wall-on-wheels. Increasingly unopposed air-puppy impacts from the left push the wall away – to the right.

of the wall, and *more* air puppies – say, a hundred – on the *other* [left-hand] side? What do you think will happen to the wall-on-wheels?"

Kids will say something like: "The wall's gonna move toward the twenty-puppies side [the wall will move to the right] because there's more puppy hits on the other [hundred-puppy] side."

Variation 2

Storyteller: "What if we start out with the same number of air puppies on both sides of the wall, but we get the puppies on *one* side really excited – so that they bumble around *much* faster than the puppies on the other side. What do you think will happen to the wall-on-wheels?" Kids will say something like: "The *fast* puppies are gonna bump into the wall faster and more times and harder, so the wall is gonna be pushed *away*, toward the slow puppies.

But if, say, some of the puppies on the right side of the wall leave the room (by a door), what will happen? Figure 3 illustrates this situation.

In this case, the wall-on-wheels is pushed to the right, as puppy bumps on the left side are less and less opposed by puppy bumps on the right side.

The Two Puppies story has been a spectacularly useful tool to those who have it at their disposal – children and adults alike. Presenting it to a group takes about five minutes, starting with "All you have to do to have your thinking transformed by this story is to tell it to someone else." The I-Club members take on new tools such as the Two Puppies story and new ways of arguing – building and weighing scientific arguments. They learn new ways to model and theorize about complex phenomena and new ways to make their thinking visible to their peers and to themselves. This makes it possible for them to critique and improve their ideas and present them to others as *experts* (as teachers of younger students or to judges at science fairs). In the process, these students do indeed begin to "re-see" the world – and they come to see themselves as competent and powerful agents within it.

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Beyond the Classroom: Collective Responsibility for Developing Proficiency in Urban Youth

Rhonda H. Lauer

Proficiency includes more than academic abilities, and achieving it will require support from out-of-school institutions as well as schools.

Most states define proficiency in specific terms. In Pennsylvania, for instance, students perform at a proficient level if their standardized-test scores reflect satisfactory academic performance. They cannot earn high school diplomas without demonstrating proficiency in reading and mathematics, either through their state test scores or in other ways determined by their school districts.

But shouldn't proficiency entail more than meeting explicitly defined reading and mathematics standards?

Achieving proficiency in basic academic skills must still be a goal for all students, particularly for urban, lower-income students who face significant challenges: unsafe schools, low performance expectations, and limited resources. A first step in reviving these schools must be to remove such obstacles to learning.

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At the same time, we must realize that academic proficiency is only one element in a set of skills young people require to become self-sufficient adults. Our definition of proficiency should be more expansive, implying a level of skill and knowledge beyond specific content areas; it must encompass practical "life skills" such as teamwork, creative thinking, professionalism, self-advocacy, and readiness for work or college.

When discussing proficiency, we also need to look outside the context of school and redefine the learning day. Children encounter many critical transitions in their lives, from birth into adulthood; to advance, they must acquire certain skills, knowledge, and behaviors. And yet, they spend just 20 percent of their waking hours in school (Corporate Voices for Working Families 2004). Clearly, learning cannot be an activity that occurs only inside a school building. After school, weekends, at home, with parents, in the community – these are all times and places for children to learn and grow.

This article addresses some of the challenges to building academic proficiency in urban youth and presents workable solutions. It also proposes a broader definition of proficiency, one that encompasses essential life skills as well as basic reading and mathematics skills. And finally, it provides examples of initiatives that move beyond the classroom and rely on long-term commitments and strategic partnerships to help children develop proficiency at every stage of life.

Addressing Obstacles to Academic Proficiency

Since 2002, Foundations' Neighborhood School Network (NSN) has managed several inner city schools for the School District of Philadelphia.[1] Prior to our involvement, these six schools – three elementary schools, two middle schools, and one high school – faced daunting challenges. The high school, Martin Luther King High School (MLKHS), was perceived as a school of last resort, where academics were secondary to safety concerns.

Creating an atmosphere conducive to learning was the first step in improving academic achievement at these schools. At MLKHS, this has meant:

- moving youth out of the hallways and into the classrooms, creating a safe environment, improving the appearance and resources of the school, implementing a dress code, and providing leadership development for administrators;
- equipping teachers with the tools they need to provide meaningful instruction, including new textbooks, access to technology, professional development, content-area coaching, and administrative support;

- encouraging the community to become invested in the school's success through the development of a parent association, volunteer opportunities, and local youth employment initiatives;
- offering students the assistance they need to acquire necessary academic and life skills, including Advanced Placement courses, after-school homework assistance, meaningful extracurricular activities, and summer school opportunities.

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1 On December 22, 2001, the state of Pennsylvania took control of the School District of Philadelphia. For years, the district struggled with failing schools and substantial deficits. To reverse this trend, several for-profit and nonprofit organizations were selected to assume management of some of the city's lowest-performing schools. Foundations manages Robert Fulton Elementary School, John Kinsey Elementary School, Francis Pastorius Elementary School, Ada Lewis Middle School, and Clarence Pickett Middle School. Martin Luther King High School was added to the NSN in 2003.

> Life skills are essential for young people to succeed. Organizations today are not seeking workers who are merely proficient in reading and mathematics.

As a result of these types of efforts, students at MLKHS and throughout the NSN are making progress. More NSN students are performing at advanced and proficient levels in reading and mathematics, as defined by the state. NSN schools are keeping pace with or exceeding the performance of comparable schools managed by the School District of Philadelphia or other private managers. And more students, at all levels, are scoring at or above the national average in reading, language, and mathematics on Terra Nova tests.

Equipping Youth with Essential Life Skills

Asserting control over school culture and instruction has allowed us to improve students' academic skills at these schools. It also has permitted us to offer programs and services that help students become proficient in other essential life skills.

We are addressing these skills because we know that they are essential for young people to succeed after high school. Organizations today are not seeking workers who are merely proficient in reading and mathematics. A recent survey of more than four hundred employers indicates that, although basic academic content is still fundamental to new workforce entrants' ability to perform, some of the most important skills they need to succeed in the workplace are "soft skills," including:

- professionalism/work ethic;
- oral and written communications;
- teamwork/collaboration; and
- critical thinking/problem solving (Casner-Lotto & Barrington 2006)

Admittedly, the primary goal of education is not to train workers; but sooner or later, most youth enter the workforce. Only 60 percent of low-income youth in this country can expect to earn a high school diploma, the basic credential for entry-level employment today. One in three can expect to enroll in college. Only one in seven will earn a bachelor's degree (Bedsworth, Colby & Doctor 2006). Students who do not plan to enter college must be able to find jobs after high school.

At MLKHS, the Job Resource and Development Center (JRDC)[2] teaches essential life skills so young people can thrive no matter what they do after high school – attend college, enter the armed services, or seek employment. The JRDC helps youth acquire five competencies deemed essential to mastering the demands of the modern workplace – the ability to: identify, organize, plan, and allocate resources; work with others; acquire and use information; understand complex interrelationships; and

2 The JRDC is a collaborative initiative, conceived and developed by Pennsylvania State Representative Dwight Evans, the Greater Philadelphia Urban Affairs Coalition, the School District of Philadelphia, and Foundations.

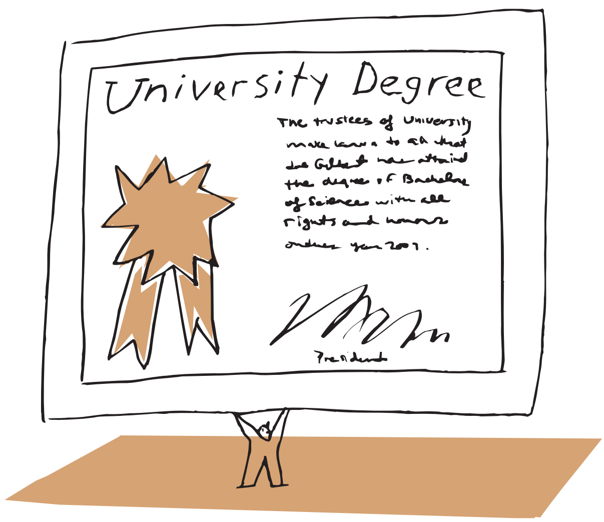
work with a variety of technologies (U.S. Dept. of Labor 1991).

Housed at MLKHS, the JRDC exposes students to the "world of work" by offering after-school training courses, placing students in meaningful part-time jobs, and helping them explore career options. In the training course, Terri Stigler and Darrell Caston, the program's directors, cover topics such as presentation and appearance, time management, interviewing, communication, and teamwork. In the past three years, the JRDC has trained over 650 students and placed more than 280 in jobs.

The stories of two students, Isiah and Blessin, show how the emphasis on developing life skills can benefit youths.[3]

Isiah Wright freely admits that in ninth grade he was a "lost" student. "I really didn't think I was going to make it, that I would drop out. I didn't like going to school. But Mr. Caston and Ms. Stigler, they talked to me, tried to get me a job, and helped me stay in school." Now seventeen and a senior at MLKHS, Isiah gets good grades, works part-time, and plans to attend college. "I wasn't even thinking about going to college, then Mr. Caston and Ms. Stigler said that's what you need to do if you really want to be successful in life."

Like the other students in the JRDC, Isiah is quick to greet newcomers with a handshake, smile, and direct eye contact. He is polite, respectful, and ready for life after high school. "JRDC has prepared me. If I wasn't ever in this program, I don't believe I would be ready. There are so many things they have taught me – like how to present myself and leave a good first impression."



3 We thank Isiah Wright and Blessin Small, students at MLKHS in Northwest Philadelphia, for sharing their stories with us.

For Blessin Small, a sophomore, Terri and Darrell are like an extra set of parents. "They teach you how to become more mature. They become like your outside family. You get a great connection with them." At fifteen, Blessin has already achieved some of the goals she has set for herself. After attending a selective accounting program at Temple University this summer, she earned a two-year scholarship to the university, where she plans to study criminal law after graduation.

Redefining the Learning Day, Sharing Responsibility

As the JRDC demonstrates, in-school time alone cannot equip youth with all the skills they need to succeed in life. Therefore, we also must acknowledge that supporting youth to be "proficient" is not solely the responsibility of schools. As we extend the learning day to include time at home, on the weekends, and in neighborhoods, responsibility for educating our children likewise broadens to include parents, communities, businesses, and government.

Extending the learning day does not mean adding more school, however. For example, well-designed after-school programs blend academic content with youth development principles. They are fun and allow children to explore non-academic pursuits such as dance, music, art, and sports; they offer safe, structured environments where children sharpen basic skills and form trusting relationships; and they help students practice skills to the point of mastery (Birmingham et al. 2005). Regular participants in high-quality after-school programs exhibit better behavior, social skills, and higher aspirations, as well as better grades (U.S. Dept. of Education 2000).

We have witnessed similar outcomes. Since 1992, Foundations has been working with communities and organizations across the country to extend the learning day. One way has been through our Center for Afterschool & Community Education (CACE). At CACE, we strive to improve after-school programming by providing professional development, field-tested tools and materials, and technical assistance –

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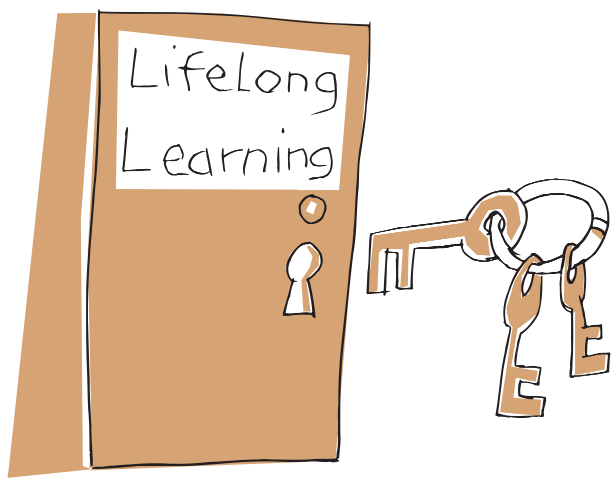
all tailored to the after-school setting. We believe that the more than 28 million school-age children whose parents work outside the home (U.S. Dept. of Education 2000) deserve expertly trained and well-equipped after-school staff who can help them become proficient in life as well as school.

Long-Term Collaboration: The Key to Lifelong Learning

While after-school programs are an important way to extend the learning day, many children from low-income households need additional assistance to overcome the educational disadvantage they have from the "starting gate" (Lee & Burkam 2002). We must begin helping such children from birth, so they can arrive at school healthy and ready to learn.

Our work managing several schools in Northwest Philadelphia has validated our belief that the educational community alone cannot provide children with all the services they need to succeed. Healthy food, safe neighborhoods, regular check-ups, caring adults: children require all these things and more. Many discrete projects and programs strive to meet these needs in underserved neighborhoods. The best outcomes, however, derive from strategic partnerships, coordination, and long-term commitments.



Consistent with this view, in 2005 Foundations assembled a coalition of organizations capable of responding to the longstanding challenges of the Northwest Philadelphia community. This ten-year collaborative initiative, KidZone Philadelphia, seeks to create an optimal learning and growing environment for the more than 50,000 youths in this seven–zip-code region. Since inception, the KidZone partners – representing government, business, community, and education – have been working to develop a holistic approach that nurtures children from birth through adulthood. Together, we are implementing an integrated set of initiatives in education, employment, and civic engagement that will help this community and its children thrive in the decade ahead.

Considering Proficiency in Terms of Life Stage

This work has convinced us that all children encounter several life stages or critical transitions as they grow up. To move from one stage to the next, they must acquire certain knowledge and skills: academic, behavioral, social, and developmental. But urban, low-income youth often contend with poor nutrition, inadequate healthcare, and dangerous or unstimulating environments. Such circumstances can retard their progress and consign them to a lifelong game of catch-up.

KidZone partners and supporters seek to remedy this inequity by helping children in Northwest Philadelphia navigate life's critical transitions successfully. We view life between birth and adulthood as a continuum with six distinct "steps to success" that lead children safely toward healthy and productive adult lives (see Figure 1).

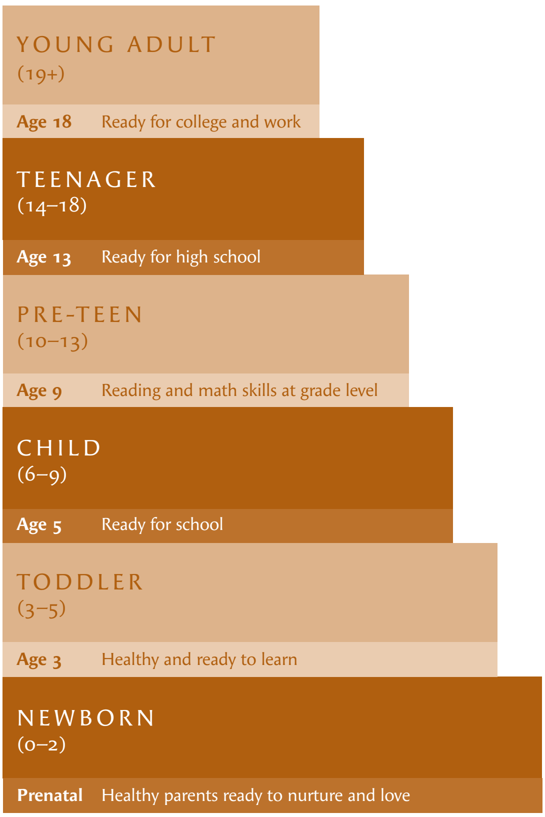


Figure 1. Steps to success, birth to adulthood

- The process of building proficiency starts at birth. KidZone offers home visitation programs to Northwest Philadelphia families: volunteers and professionals provide prenatal care, teach parenting skills, and connect families to community resources. KidZone also prepares young children to enter school through quality preschools and aggressive kindergarten registration drives.
- Research suggests that the greatest predictor of success for youth is reading at grade level by third grade

(National Research Council 1998). KidZone offers training and technical assistance to after-school and community-based programs that provide fun, creative activities and help children build grade-appropriate reading and mathematics skills.

- KidZone also strives to ensure that teenagers and young adults are equipped for higher education or self-sustaining employment. In close collaboration with local schools, businesses, and universities, KidZone helps students determine career goals, find jobs, and move toward independence.

For a community to prosper, everyone who lives or works there must be invested in its well-being. Through organized outreach, volunteer activities, and youth mentoring, KidZone helps residents work together to improve the community for all its members.

Is Proficiency Enough?

Proficiency is a good first goal for our youth, but is it enough? Aren't we doing our children a disservice if mere proficiency is the ultimate aspiration for them, when the expectations of colleges and employers are much higher?

Excellence is the new standard for global competitiveness, but employers report that new workforce entrants at every educational level – especially those coming directly from high school – show significant deficiencies in basic knowledge and applied skills (Casner-Lotto & Barrington 2006). Recent comments by Diane Melley (2006), corporate director of community relations for IBM, outline the disturbing implications of this lack of preparedness. She notes that for much of the past century, the United States was the world's innovation engine; but now, other countries such as China, India, and South Korea are assuming that role.

Why is that? "In our nation's middle schools today, nearly 70 percent of our students are assigned a teacher who holds no major, or any certification, in mathematics. And the record in science is even worse. We also have deep gaps in the teaching of history, foreign languages, and other disciplines, too. They are all important keys to innovation," states Melley.

To help students develop the level of excellence required by today's (and tomorrow's) employers, teachers must be of high quality and advanced proficiency themselves. Often, though, they are not even proficient in their content areas. Many teacher-education

Children need nutritious food, safe homes, informed parents, and good teachers, as well as learning opportunities that go beyond the school day.

graduates are prepared in programs with low admission and graduation standards that are disconnected from school practice and practitioners. Limited fieldwork leaves many of them unable to handle the realities of the classroom (Levine 2006). We must demand more from those who teach, and we must equip them with the knowledge, tools, and experiences they need to excel. Otherwise, our children have little chance of reaching proficient, let alone advanced, levels of achievement.

Growing up, urban youth face many challenges. Overcoming them is too much for schools alone to handle. After-school programs that blend academics and youth development and collaborative efforts such as KidZone, which utilize the resources and expertise of a variety of organizations and individuals in the community, offer a greater chance of success.

Such endeavors recognize that children need nutritious food, safe homes, informed parents, and good teachers, as well as learning opportunities that go beyond the school day and provide them with the academic and life skills they need to find jobs, advance in careers, and support families when they become adults.

All of us are responsible for the welfare of our nation's children, no matter where they live. We must work together now to ensure that they thrive in the years ahead.

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