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Adequacy beyond Dollars: The Productive Use of School Time

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THE INFUSION OF more dollars into poorly performing school systems often yields disappointing results, as other essays in this volume demonstrate.[1] The legal concept of adequacy needs to be broadened to ensure the adequacy not just of inputs but also of outputs. Adequate outputs are what finally count in education. In this chapter I will discuss some of the forces and practices that inhibit good educational outcomes, no matter how much increased spending is used to support schooling.

Irrespective of dollars spent, the *only* way to achieve outcomes that are excellent and equitable is through the productive use of school time. A fundamental difference between a high-performing and a low-performing school is always the degree to which school time is being used productively—through offering

1. Parts of this essay are taken from my recent book: E. D. Hirsch Jr., *The Knowledge Deficit*, Boston: Houghton Mifflin, 2006.

students cumulative, progressive, nonrepetitive learning. To illustrate this fundamental point about educational adequacy I will use the example of reading comprehension, which is known to correlate highly with academic achievement generally (McGhan 1995).

The Unproductive Use of Time in American Schools

Most instructional activities that teachers and parents engage in with young children have been shown by research to be beneficial. But research rarely asks or answers a crucial question—what is the *opportunity cost* of engaging in this activity rather than that one? Opportunity cost is an important concept from economics that reflects the fact that some benefits are forgone whenever we engage in one activity rather than another. If we teach formal reading-strategy exercises or if we read the same story three times to a child, we need to ask: how great are the benefits that will accrue to the child by doing those things as compared with the benefits that would have accrued to the child if we had used that valuable time in more productive kinds of activities such as reading further stories on the same topic?

Under the influence of the No Child Left Behind law, the principle of opportunity cost has become ever more important, since longer periods are devoted to reading in school. New York City and California have ruled that 150 minutes—two and a half hours of school time every day—must be spent on language arts in the early grades. Other states and localities require 90 minutes a day. This means that time is being allotted to language arts that formerly might have been allotted to history, science and the arts. Yet those neglected subjects are among the most essential ones for imparting reading skill.

The international comparisons of reading achievement show that our schools are among the least productive schools in the

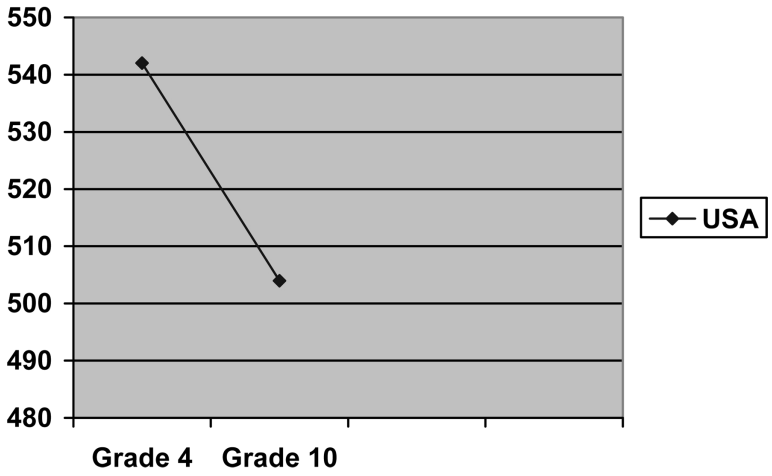

Figure 8.1 United States Reading Achievement Compared with that of Other Nations

developed world. Our children start school knowing on average as much as children in other developed nations, but each year that they stay in school they fall further behind. In the third and fourth grades, U.S. performance is on a par with that of other developed countries. Then, in later middle-school grades, the differences grow, and the United States gradually drifts downward. In recent studies our fourth graders scored 42 points above the international normalized average of 500—ninth in reading among thirty-five countries. By tenth grade they scored just 4 points above 500—a decline of 38 normalized points between the fourth and tenth grades. They also exhibited a striking decline in relative ranking. Figure 8.1 shows our downhill ski slope of reading achievement from fourth grade to tenth grade, comparing American achievement with that of the rest of the world (NCES 2000; Lemke 2001).

A similar pattern (figure 8.2) is found in the most recent international studies of math. Our fourth graders start out knowing about as much reading and math as fourth graders do in

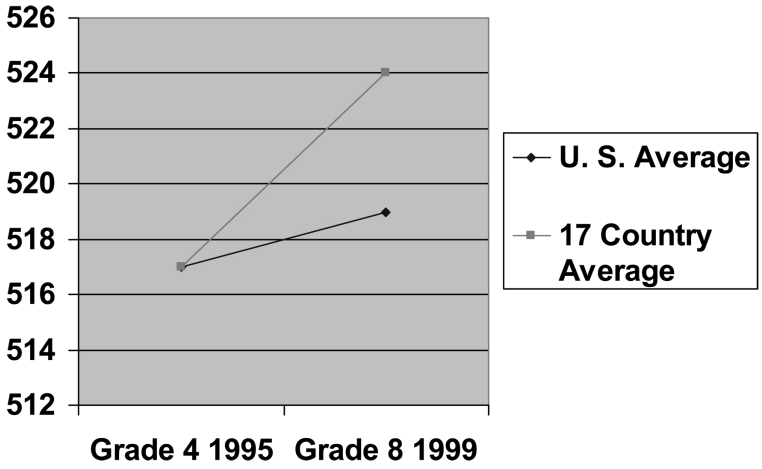

Figure 8.2 Math Achievement, Grade 4 to Grade 8
Note: This graph tracks the math scores for the same cohort of students from 1995 to 1999.

other countries. By eighth grade, they have fallen behind those same students (PIRLS 2001; OGLE 2003).

It's a remote logical possibility that the reason for our relative decline with each successive grade could lie in factors other than our unproductive use of school time—for instance, our distracting culture, our diversity, our racism, our unequal income distribution. But other developed nations have ethnic diversity, racism, distracting cultures, and unequal income distributions and nonetheless have higher-performing schools. Sociological explanations are not very plausible when our school curricula and teaching methods are themselves inherently unproductive. Why seek remote causes for our low educational productivity when more immediate ones are available?

Blaming Teachers

Some people blame ineffective teachers for our poor showing over time on international comparisons. But "low teacher qual-

ity" is not some innate characteristic of American teachers; it is the consequence of the training they have received and of the vague, incoherent curriculums they are given to teach, both of which result from an education school de-emphasis on specific, cumulative content. No teacher, however capable, can efficiently cope with the huge differences of academic preparation among students in a typical American classroom—differences that grow with each successive grade (Stevenson and Stigler 1992). (In other nations, the differences between groups diminish over time [Hirsch 1996].) Even the most brilliant and knowledgeable teacher, faced with such wide variations in preparation, cannot achieve as much as an ordinary teacher can in a more coherent curricular system like those found in the nations that outperform us.

The chief cause of our schools' inefficiency is this curricular incoherence (Hirsch 1996). At the beginning of the school year, a teacher cannot be sure what the entering students know about a subject because the students have experienced very different topics in earlier grades, depending on the different preferences of different teachers. Usually, the teacher must spend a great deal of time at the beginning of each year in reviewing the preparatory material that is needed for learning the next topic—time that would not have to be so extensive (and so boring to students who already have the needed knowledge) if the teacher could have been sure that the incoming students had all gained the necessary preparatory knowledge.[2]

Proposing to improve teacher quality without grasping the relation between the low effectiveness of teachers and the romantic, formalistic ideas of the education world is to mistake an effect (teachers' inadequate subject matter knowledge) for an un-

2. Or else the teacher, not knowing that dinosaurs and firemen were taught in the previous grade, teaches them again in the new grade—a different source of inefficiency.

derlying cause (the dominant education school ideas that cause the knowledge to be withheld from them). It is true that many American teachers are ill informed about the subjects they teach, and it is true that this reduces their productivity in the classroom. But this is not because they are inherently lazy or incompetent. It is because of the anti-fact, how-to ideas that permeate their training. American education schools consider it their job to provide teachers mainly with naturalistic and formalist ideologies. Subject matter knowledge in history, science, literature, and the arts, (to the extent that it is considered necessary at all) is an imprecisely defined area that education schools assign (without guidance) to other departments of the college or university (Clifford and Guthrie 1988; Ravitch 2000). In short, the low productivity of our schools is chiefly caused by bad theory rather than by teachers' innate incompetence. We will not improve teacher effectiveness until we change the unproductive ideas that dominate teacher preparation and guarantee poor use of school time.

The Root Causes of Unproductive Time Use

Under the schools' dominant ideas—that how-to knowledge is more important than content, and that hands-on, discovery experience is more important than mere words—our schools are bound to use time unproductively. In the teaching of reading, the formalist, how-to approach wastes time because it pursues a nonexistent will-o-the-wisp, namely, content-indifferent reading skill. This formalist approach, because of its extremely high opportunity costs, is inherently unproductive. Reading comprehension doesn't consist in *consciously* performing formal operations on a text, such as guessing what the main idea is. While it's true that we must make guesses about what an utterance means, we have all learned how to make such meaning-guesses

simply by having learned to use language at all. Unproductive how-to exercises take time away from knowledge-gaining activities that really do raise reading achievement.

By the same token, a naturalistic, "hands-on," "discovery" way of teaching reading and other subjects is known to be less productive on average than a more direct approach. Many studies, summarized in the late Jeanne Chall's fine book *The Academic Achievement Challenge* have shown that the discovery approach is less time effective than the explicit, goal-directed approach to teaching (Chall 2000). While the naturalistic discovery approach certainly has a place in education, it has been shown to be wasteful of time when used as the principal method of fostering student learning. Nowhere has the inefficiency of "natural" learning been more apparent than in first-step reading—the discovery learning way of teaching young children how to translate print into sounds and words.

Many parents and teachers are familiar with the "whole language" approach to teaching phonics. In the 1920s and earlier, it was called the "whole-word" approach, so the idea is very old. Indeed, the romantic idea that decoding should be learned naturally goes back to the nineteenth century (Mann 1843). It was held then, as it is by some today, that children discover naturally how to turn printed symbols into sounds simply by being exposed to accompanying pictures and other clues about what the words are. Under this whole-word "discovery" method, therefore, children are asked to be little Sherlock Holmeses who are compelled to deduce the phonic code from indirect clues. Some children manage this feat rather well—even if slowly. But other students taught by this method do not manage it at all. Even for the more successful students, the whole-word guessing method is excessively wasteful of time, for if you want to teach a child that the letter *s* sounds like *ssss*, the fastest way to do so is to

tell them that fact, help them practice their new learning, and probe to see whether they have learned it (NICH Report 2000).

Better Time Use Means Greater Fairness

An effective use of school time is especially important in all areas of learning connected with advancing language comprehension, which is inherently a slow process. For children who grow up in homes with highly articulate parents, where a toddler is hearing a wealth of language every day, the need for time effectiveness in enlarging language is less than it is for children who grow up in language-barren circumstances. Two researchers, Betty Hart and Todd Risley, have shown in detail how critical are the early pre-preschool, toddler years for enhancing later comprehension. Their path-breaking work, in which many hours of speech interactions were recorded in the homes of very young children from different social groups, showed that what toddlers heard at home in the way of speech patterns and vocabulary was hugely different, depending on social class. Not only was the sheer quantity of words heard much less in some homes than in others, but also the styles of language use were different. A child's ability to understand language turns out to be highly dependent on whether or not the parent said things like "*Do you want to play with your chalk, or do you want to get your pegs out?"* That's the kind of elaborated talk that middle-class toddlers hear. It is in contrast to the laconic utterances often used by less-well-educated parents, who say things like "*Move!*" and "*Be quiet!*" (Hart and Risley 1995, 58). Hart and Risley show that these differences in what toddlers hear currently account for most of the variation in later reading progress.

One way of changing this result would be to change the habits and speech patterns of parents. Desirable as that might be, the speech differences between low-income and middle class

households are likely to persist until our educational system improves over many years and educates future parents better. From the standpoint of progress in language right now, schools themselves should try to become supereffective middle-class homes. If that is done, higher school achievement and greater equity will be the result.

When James Coleman, the great sociologist of education, analyzed the school characteristics that had the greatest effect on educational achievement and equity, he found that effective use of time was a chief factor. What was most important was "intensity," a persistent, goal-directed focus on academics that caused classroom time to be used productively (Coleman 1990). Schools with greater academic intensity produced not only greater learning but also greater equity. Such good schools not only raise achievement generally but also narrow the achievement gap between demographic groups. The first finding is obvious, since an intense focus on academics is self-evidently the most likely way to raise academic achievement. The second finding—regarding the equity effect of effective time use—is more interesting, and it has positive implications for both advantaged and disadvantaged students.

The theoretical explanation for Coleman's finding about equity is as follows: When more is learned in school during the course of a classroom period and during an entire year, disadvantaged students begin to catch up—even when their advantaged peers are also learning more or less the same things as they are. That is because disadvantaged students start out knowing less, so each added bit of learning is proportionally more enabling for them than for students who already knew more. If we are reading a story about Johnny Appleseed and some students know how plants grow while others don't, the latter group, the botanically challenged students, will be the ones who learn

most from the story, although both groups will learn something new about Johnny Appleseed.

And there is a further reason for the equity effect that Coleman observed. When a lot of learning is going on in school, that fact changes the proportion between the academic knowledge gained inside school and the academic knowledge gained outside school. When many academic things are being learned *inside* school, the academic gap narrows because disadvantaged students are more dependent on schools for gaining academic information than advantaged students are. Advantaged students have a chance to learn many academically relevant things from their homes and peer groups, whereas disadvantaged students learn academically relevant things mostly from their schools. Boosting the in-school proportion thus reduces the unfair distribution of out-of-school learning opportunities.

In a productive classroom, disadvantaged students are getting proportionally more out of schooling, without holding back advantaged ones. Unfortunately, however, if the school is an unproductive one, it will have a greater *negative* effect on disadvantaged than on advantaged students (Coleman 1990). That is the reason American schools have not lived up to their democratic potential.

Examples of Effective Time Use

What students chiefly need to read well is relevant knowledge. Hence the most productive approach to imparting reading proficiency to children is to build up cumulatively the most enabling linguistic and world knowledge in the most time-effective way. When children are offered coherent, cumulative knowledge from preschool on, reading proficiency is the result. A coherent approach to content will produce this result even in the absence of a good, content-oriented language arts program, as the results

in Core Knowledge schools show (Smith 2003). If besides this solid regular curriculum, students are offered a content-oriented language arts program, integrated with the curriculum as a whole, their progress in reading will be more rapid still.

The fullest evidence for the validity of this prediction comes from large-scale studies conducted by French researchers into the effects of very early school instruction on later reading achievement (French Equity 2006). The French are in a good position to perform such studies. They have been running state-sponsored preschools for more than a hundred years. By age five, almost 100 percent of French children, including the children of immigrants from Africa, Asia, and southern Europe, attend preschools. At age four, 85 percent of all children attend, and astonishingly, at age two, 30 percent of all children attend. The analyses of records from tens of thousands of students, records that include detailed information about race, ethnicity, and social class, show that the earlier the child starts, the greater will be the positive effect on reading. By the end of fifth grade in France, the relative benefit to disadvantaged pupils who start at the amazingly early age of two, rather than four, is more than one-half a standard deviation, a large effect size. Those who start at age three do better in later reading than those who start at age four, and starting school at age four is better than starting at age five. These studies show that the long-term gain in starting early is greater for disadvantaged than for advantaged students, thus confirming the theory that effective schooling is in itself compensatory.

But because progress in language is slow, the relative academic benefits revealed by these French data do not show up fully until grade five and beyond. This delayed effect is an important and understudied feature of good early schooling. A deferred effect similar to that found in the large-scale French studies was found also in an analysis by F. D. Smith of the reading

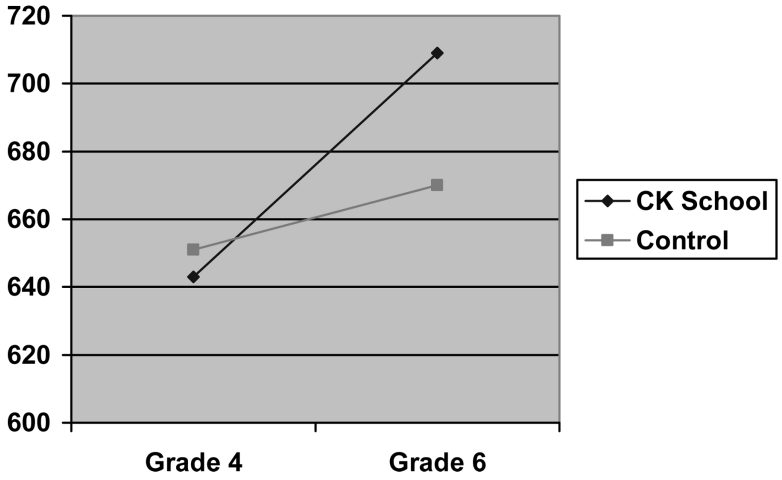

Figure 8.3 Reading Achievement Grade 4 to Grade 6 (Stanford-9 Test)—Core Knowledge School versus Control School.

scores in a Core Knowledge school compared with those of a control school (Smith 2003). In that longitudinal study, the students in the Core Knowledge school received the Core Knowledge curriculum, a coherent, grade-by-grade curriculum designed to provide the knowledge most useful for reading comprehension. The students in the control school received the standard how-to/hands-on curriculum that prevails in most schools throughout the nation. In grades K–3, the test scores of both groups of students were on a par. In fact, Core Knowledge students were somewhat behind. But by grade six there was a large differential effect favoring the Core Knowledge students, both in equity and in reading achievement. Figure 8.3 shows the achievement effect.

Some explanation of these patterns of deferred effects may be found in the work of Joseph Torgesen and his colleagues, who show that reading tests vary in their emphases as students advance through the elementary grades (Schatschneider et al. 2004). In the earliest grades, scores on standard reading tests

depend mostly on mastering the mechanics of reading—on being fluent and accurate in the decoding of words. Thus in the earliest grades, scores on standard reading tests are relatively less dependent on students' world and word knowledge. Then with each advancing grade, because of the changing nature of the tests, the factors change that are most important for test scores. In later grades, reading scores depend mostly on word and world knowledge.[3] This means that even if parents and teachers are doing everything they should to use time effectively in the early grades, they can't expect immediate, large, magic-bullet improvements in reading comprehension in the first few grades. But they are laying essential groundwork. The data show that the improvements will show up later.

Here is one practical way in which a coherent curriculum can achieve significant gains in children's reading proficiency: Everyone knows that proficient reading requires an adequate vocabulary. Everyone also knows that children's vocabularies grow when they hear or read stories. But not everyone knows how to answer the following question: What is the most effective way to build vocabulary? Is it better to read a child a short text of a different kind each day, or is it better to stay on a single topic for a period that stretches over several days or weeks? Some important research suggests that a child can learn words much faster if the teacher sticks to the same topic for several sessions. This is because word learning occurs much faster—up to *four times faster*—when the verbal context is familiar (Landuaer 1997).

3. If the very early tests had been designed to measure students' *oral* comprehension of utterances, it is, however, likely that the most critical factors in reading comprehension, both early and late (given adequate decoding skill), would turn out to be students' word and world knowledge. This prediction is supported by Sticht's finding that early listening skill reliably predicts later reading skill (Sticht et al. 1974).

The aim of adequacy laws in the end is to ensure both adequate educational quality and adequate fairness. Neither aim can possibly be achieved without adequate productivity in the use of school time. The *only* way to reach the long-desired educational goal of high achievement with fairness to all students is through a structure of schooling in which each grade builds knowledge cumulatively (and without boring repetitions) on the preceding grade. That structure has been lacking in the United States since the 1940s. Until it is in place, no dollar figure can produce educational adequacy.

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