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ABSTRACT

The best way to help disadvantaged and minority children overcome educational injustice is to impart to them, and all students, a universally shared core of knowledge. Unless this is done, many disadvantaged and minority students will continue to lag behind their peers in academic achievement. Research has shown that systems that achieve across-the-board effectiveness in early schooling are those which specify a core of knowledge that children should acquire in each grade of elementary school. By contrast, educational systems without a core knowledge requirement have universally failed to achieve educational fairness. French, German, and Swedish elementary schools, for example, effectively narrow the gap between advantaged and disadvantaged students in the first few years of schooling. In the United States, on the other hand, this gap widens, with many disadvantaged students falling further behind as the years progress. Without an agreed-upon core of knowledge at each grade level, the American system is also unfair to the large number of students, both advantaged and disadvantaged, who transfer from one school district to another each year. The Core Knowledge Foundation has developed a "Core Knowledge Sequence for Grades 1-6" to address these deficiencies in the American system. Those few schools that are well along in implementing Core Knowledge are reporting improved test scores and attendance. (MDM)

Core Knowledge™ Foundation

Fairness and Core Knowledge

E. D. Hirsch, Jr.

Overcoming educational injustice is the new frontier in the struggle for civil rights. But it is a more subtle and confusing struggle than the one involving sit-ins and freedom rides. It is a battle of experts and slogans in which ignorant armies clash by night, where it is hard to tell good from evil, true from false. Both the left and the right genuinely desire a good education for every child, and believe that our national well-being hinges on educating all children to their potentials. Yet as American children move from first grade to second, and onward, the academic gap between privileged and disadvantaged children grows wider.[1] In several other countries, the opposite occurs; the learning gap between haves and have-nots grows smaller and in some cases disappears as children move through school.[2] Is America really so different -- so "diverse" as compared with other countries -- that we cannot learn from them how to give all children an equal chance?

In France, disadvantaged children enter a school system that has explicit requirements for each grade. Each child's progress in meeting those requirements can be monitored in detail, so that extra help can be quickly provided when needed. Under these circumstances, disadvantaged children in France soon catch up. Why are our results so completely different? One plausible explanation is that our children enter a public school system which is so fragmented that, in effect, every school or even classroom follows its own sequence of study. Teachers and remedial specialists lack guidelines to the specific knowledge and skills that each child should acquire in each grade. The contrast with French specificity could hardly be more dramatic. The American vagueness about what a child needs to learn in a grade seems more than any other circumstance to cause the learning gap to widen.

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Apart from some thoughtful scholars like James Comer and Henry Louis Gates, experts concerned with helping disadvantaged and minority children have badly misunderstood my argument in Cultural Literacy (1987) that, in order to overcome unfairness in schooling, it is necessary to impart a universally shared core of knowledge.[3] Only by doing so, I argued, could we surmount the fundamental injustice of educating some children to their potentials while allowing others to stay mired in ignorance and semi-literacy. Many experts jumped to

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the conclusion that my advocacy of a shared core of knowledge was really a plan to impose WASP culture on people who are entitled to their own. They proposed that multicultural education would be a more effective way to avoid educational unfairness. But their response did not really touch upon the fundamental issues that I raised concerning educational justice.

After all, it would be a simple matter to include multicultural school content as part of the specific knowledge that all children should share. The question of multiculturalism is a significant one, and I have written about it elsewhere in an accommodating spirit.[4] But I shall put aside entirely the question of multiculturalism for the space of this essay in order to explain in detail why fairness demands that elementary schools impart a core of shared knowledge -- however defined. In the years since 1987, the issue of fairness has become ever more pressing, and new evidence has appeared that strengthens the connection between core knowledge and educational justice.

Educational justice means equality of educational opportunity. It does not mean (since some children are apter and harder-working pupils than others) that all students should get high test scores. Nonetheless, you can tell whether a school offers its students an adequate educational opportunity by looking at its average level of achievement. This overall outcome is an accurate index to educational fairness, because the human potential of a schoolful of elementary-school children, whether in the inner city or in the suburbs, does not vary enormously from one school to another. A national school system that is fair will not exhibit huge variations in the average outcomes of its schools. (This observation suggests that fairness is strongly correlated with the overall quality of schools -- a point I shall touch on later.)

Adopting this reasoning about the significance of variations in school outcomes, the International Association for the Evaluation of Educational Achievement (IEA) has begun to report on the proportion of schools in a nation that fail to offer students adequate educational opportunity. The fairness of a nation's educational system can be correlated with the IEA's rating of the percentage of a nation's schools whose average outcomes fall below a minimal international standard. On this criterion, the United States, with some 30% of its elementary schools below the minimal standard, has, after Italy, the least fair educational system in the developed world.[5]

Sources of Unfairness in Public Schooling

On average, all children will learn relatively well in an effective school. Research data about how to make individual schools effective are inconsistent and complex, but the large-scale evidence about school effectiveness, covering entire school systems across many cultures, is quite unambiguous.[6] Systems that achieve across-the-board effectiveness in early schooling are systems that specify a core of knowledge which children should acquire in each grade of elementary school. All the national systems that are fair by the IEA standard do in fact use this core-knowledge approach. By contrast, no national system that fails to use a

core knowledge approach has managed to achieve fairness. The cross-correlations between fairness and core knowledge are 100 per cent.

Most Americans know that our various school districts have diverse standards for the skills and knowledge that children should acquire in each grade. But few know that the districts rarely mandate specific knowledge for any grade. Here is a typical set of district guidelines for history in first grade:

The child shall be able to identify and explain the significance of national symbols, major holidays, historical figures and events. Identify beliefs and value systems of specific groups. Recognize the effects of science and technology on yesterday's and today's societies.[7]

Let us focus on just one phrase in those guidelines:

Identify beliefs and value systems of specific groups.

Compare that highly general admonition with the following excerpt from a more specific guide to first-grade history:

Introduce ancient civilizations and the variety of religions in the world, using maps of the ancient world. Specifics: Egypt: King Tutankhamen; Nile; Pyramids; Mummies; Animal Gods; Hieroglyphics. Babylonia: Tigris and Euphrates; Hammurabi. Judaism: Moses; Passover; Chanukah. Christianity: Jesus. Arabia: Mohammed; Allah; Islam. India: Indus River; Brahma, Hinduism; Buddha. China: Yellow River; Confucius; Chinese New Year.[8]

Detailed guidelines provide clarity where there is now confusion. They help by distinguishing between knowledge that is required and knowledge that is merely desirable. By privileging specific concepts and information, explicit guides reduce the total amount of concepts and information that a teacher needs to consider essential. They thereby encourage greater depth and coherence in teaching. On the debit side, detailed guides also tend to generate disagreement -- a fact that partly explains why school districts continue to issue vague guidelines. Why be specific when vagueness will avoid controversy?

But against this bureaucratic convenience stands the great value of highly detailed standards to disadvantaged students and those who try to remedy their educational deficiencies. Explicit guides enable tutors to focus on the specific knowledge that students need in order to attain grade level. Absent such specific guides, disadvantaged students and their tutors in this country play a game whose rules are never clearly defined. Soon the

unlucky are consigned to slow tracks from which they can never enter the mainstream of learning or of society.

By contrast, tutors in West Germany, having the benefit of detailed guidelines, are able to bring the highly disadvantaged offspring of Turkish "guest workers" up to grade level, despite the enormous educational handicaps of Turkish children in Germany.[9] In all of the core-knowledge systems of the world, the standard method of remediation is to diagnose the knowledge and skills that each child lacks, according to detailed grade-by-grade standards, and then focus on those specifics. This process of remediation begins in first grade and continues at need in subsequent years, enabling every normal child to be kept at grade level.

The Widening Gap and the 4th-Grade Slump

While the IEA report discloses that the American system is unfair to the thirty percent of students who attend ineffective schools, additional evidence of another kind shows that our system is universally unfair to disadvantaged students. In the United States, the gap between academic haves and have-nots grows wider in each successive early grade, until, by fourth grade, it is often unbridgeable.

This tragic process currently seems inexorable. The longitudinal researches of Loban in the 1960s (replicated by Chall in the 1980s) tracked the acquired learning abilities of cohorts of disadvantaged and advantaged students as they moved from grade one to grade four and beyond.[10] To grasp the results of this research, imagine a graph with the vertical representing learning ability and the horizontal representing time. The lines on the graph that represent the median abilities of the two groups over time will then look like a V that is turned about 45 degrees to the right, with the narrow end at kindergarten. Loban and Chall show that a small educational disadvantage in kindergarten normally becomes a huge learning gap by grade four, a result that unfortunately applies even to graduates of Head Start.[11]

But this disheartening characteristic of American schools seems less than inevitable when we look at the successes of Swedish, German and French schools in teaching third-world and other disadvantaged students.[12] As children progress through those systems, the gap between haves and have-nots grows narrower rather than expands! The main reason these other systems are fairer to disadvantaged students is that they are able to compensate for the snowball effect of background knowledge upon early learning -- a snowball effect that allows a small knowledge difference in kindergarten to become a huge gap in learning ability within a few years.

For most young children, new knowledge expands exponentially, as anyone can testify who has watched a three-year-old acquire new words and build new knowledge upon old. The words that children hear in school are like so many snowflakes falling on the school ground. (To continue the snowball metaphor, we would need to picture the children rolling among these flakes like so many snowballs!) Disadvantaged children may hear the words, but

they do not pick up the meanings, whereas children who have already accumulated a covering of knowledge and vocabulary will be picking up knowledge rapidly. As their academic snowball grows, so does their ability to accumulate still more knowledge -- in strong contrast to disadvantaged students whose initially meager learning abilities get smaller and smaller by comparison, humiliating them still further and destroying their motivation. This continual widening of the learning gap cannot be halted unless schools make a systematic effort to build up the specific background knowledge that disadvantaged children need.

Being Unfair to Newcomers

What makes our schools unfair, then, is that some students are learning less than others because of systematic shortcomings in their schooling rather than because of their own innate lack of academic ability. This injustice arises from the systematic failure of our schools to teach all children the knowledge they need in order to understand what the next grade has to offer. How can any teacher be sure that a child is ready to learn the lessons of third grade, if we don't define explicitly what second-graders ought to know? How can a third-grade teacher reach all children in a class when some of them lack the necessary building blocks? Probably one of the most important tasks of early education is to insure that all children have the background knowledge they need at each stage of schooling. Yet our system currently leaves that supremely important job to the vagaries of individual districts, schools, and, very often, individual classrooms.

It is a fundamental injustice that what American children learn in school should be determined by whether their homes have given them the background knowledge they need for academic work. A nation's public schools have a duty to educate all students to their potentials. A disadvantaged child's initial lack of preparation is not a mere given that the school is powerless to change; it is a challenge that some schools in the world are meeting and which all our schools could rise to if we launched a serious effort to overcome the incoherence of our system regarding the content of elementary education.

As an illustration of that incoherence, consider the plight of Jane in Calhoun County. In school A, first-grade teachers have deferred all world history until grade four, but in school B, in the same district, first graders are learning about ancient Egypt. Leaving school A after first grade, Jane goes to school B where the other children had studied Egypt in the previous year. The new teacher's references to the Nile, the Pyramids, and hieroglyphics simply mystify her, and fail to convey the new information that the allusions to ancient Egypt were meant to impart. Multiply that day's failure of comprehension by many others in Jane's new environment, and then multiply those by further comprehension failures that will accrue because of the initial failures of uptake, and we begin to see why Jane is not flourishing in her new school.

Still greater handicaps are inflicted on a newcomer who must go to a new school in a totally different part of the country. Some of the schools around metropolitan Washington

and in parts of Florida, California, and elsewhere now report that forty percent of their students are newcomers.[13] When one of these new children happens to be a disadvantaged child (as is disproportionately the case in our society, because low wage earners are the most frequent movers), the inherent handicaps of being a newcomer in an American school are greatly exacerbated. It is again the disadvantaged who suffer most from the structural incoherences of the American educational system.

Resisting a Universal Core Sequence

It will not surprise the reader to be told that the only and obvious antidote to incoherence in school content is to reach agreement on a grade-by-grade core of content for elementary school. The core need not take up more than 50% of total classroom time, leaving plenty of room for local variation and imaginative approaches. But it is exceedingly difficult to reach agreement about school content in the United States. The practical hurdles are no doubt great, but the top priority in surmounting them must be to spread awareness of the problem itself and to resist attempts to deny its existence. The direct solution to the educational problem -- defining a specific and universally-accepted core of knowledge -- goes so much against the American grain that experts have developed astonishingly resourceful techniques of avoidance to resist the idea of core- knowledge standards. But the public needs to recognize these denials for the evasions they are.

Here, by way of example, are a few characteristic arguments or slogans that experts use to deny the need for a core of universal content standards.

* We already have an informal core-knowledge system in the United States, determined by the widespread use of just a few textbooks.

* We do not need to emphasize <u>particular</u> content at all. Knowledge is changing and increasing so rapidly that the best approach is to teach children <u>how</u> to learn.

* There is a danger that standardization of content would be imposed by the Federal government and would open the way to Federal control of education.

* We have educated children reasonably well in the past without using a core of universal content standards.

* It is illegitimate to compare the United States with other countries, which are in every case far less diverse than we are.

* A common core of knowledge would obliterate the distinctive characteristics of American localities, and make schools into cookie cutters that turn out the same product everywhere.

Elsewhere, I have responded to each of these highly dubious expressions of resistance to change, none of which can stand up to detailed examination.[14] I haven't the space to repeat that exercise here, and in any case, there are straws in the wind that indicate a growing recognition of the need to define core knowledge. Various professional groups such as the National Councils of Teachers of Mathematics, of Science, and of Social Studies have passed resolutions committing their organizations to develop guidelines for their particular subject matters. A few states have created or resolved to create grade-by-grade core curricula for their schools.

These recent moves by a few states are promising insofar as they begin to define, however vaguely, a definite sequence for elementary-school content. With luck, all fifty states will someday agree with each other about a common core sequence. Until such time, however, which may be far-off, it is essential that at least at the school level, a core of shared knowledge be defined in a specific, sequenced way, if a school is to achieve excellence and fairness.

My co-workers and I at the Core Knowledge Foundation, while advocating the teaching of a sequence of specific knowledge, also realize that it is not feasible, nor necessarily desirable, to wait for a top-down consensus on what this knowledge should be. Accordingly, the Foundation has undertaken an effort that combines scholarly research with grassroots experience to develop a working consensus upon a specific sequence for grades one through six. This working consensus, known as the Core Knowledge Sequence for Grades 1-6, is a planned progression of specific knowledge in history, geography, mathematics, science, language arts, and fine arts. The Core Knowledge Sequence does not presume to stipulate everything American schoolchildren should know. Rather, it represents a working agreement regarding the minimum knowledge that children should acquire in grades one through six. The Sequence is meant to comprise about 50% of a school's curriculum, thus leaving ample room for local requirements and emphases.

The content of the Core Knowledge Sequence is the result of four years of research, debate, and consultation with parents, teachers, scientists, professional curriculum organizations, experts on America's multicultural traditions, and the curricula of other countries with proven success in elementary education. The Sequence represents a consensus of many diverse groups and interests: a provisional version was debated, modified, and finally ratified by a group of about 100 persons representing diverse areas and constituencies at a conference in March 1990. The Sequence is part of an ongoing process that we keep democratic and grounded in experience by involving many teachers in schools around the nation. As these teachers use the Sequence, they are asked to draw upon their classroom experience to help determine revisions of the Sequence.[15] Other revisions of the Sequence are based upon suggestions from the Foundation's technical and multicultural advisors.

We do not claim that the specific grade-by-grade guidelines in the Core Knowledge Sequence are better than some other well-thought-out core: no specific guidelines could possibly constitute the Platonic ideal. But, in order to offer something useful, and to get beyond talk to practice, we created the best specific guidelines we could.

The Core Knowledge Sequence, and publication of a series of resource books based on the Sequence,[16] are two of the initial moves of a campaign to start a discussion of core knowledge for the early grades. Our hope is that even if the Foundation's model core sequence is not the one that will be finally accepted nationwide, its mere existence will dramatize the need for a specific core in grade school. We also hope it will help insure that if ever there is any officially accepted core, it will be as effective as the Core Knowledge Sequence has already shown itself to be.

At this time, the curricular recommendations of the Core Knowledge Sequence have been accepted, wholly or in part, at more than fifty elementary schools around the nation. (In the state of Pennsylvania, one school in Philadelphia has started out by integrating Core Knowledge content into grades K-2, while the Wilkes-Barre Area School District has made long and careful investigations of the Core Knowledge Sequence, and is in the process of considering implementation in the fall of 1993.) A few schools that are well along in implementing Core Knowledge--schools in Texas (San Antonio), New York (South Bronx), Indiana (Richmond), and Florida (Ft. Myers)--are reporting improved test scores, higher attendance rates, tremendous student enthusiasm, and greatly increased professional collaboration among teachers who, for once, share some solid, sequenced, clearly defined content guidelines.

Conclusion: Fairness and Excellence

In this brief essay I have tried to show concisely how a lack of agreement on a specific core of content in early grades is an insuperable barrier to fairness in American schools. My arguments (generally accepted by educational experts outside the United States) have not depended on any particular conception of what that content should be. Any sensible version of core content would be about as effective as any other sensible one for developing a fair system. I want to conclude by observing that there is a strong connection between the use of core knowledge and the achievement of excellence in early education. It is highly significant that core-knowledge countries have the best fairness scores and the best achievement scores in early grades.

Some of the underlying reasons for these favorable results are similar to those I have already traced. An educational arrangement that enables all children to learn at grade level will cause classrooms to be more lively and conducive to learning. When all children have the background knowledge they need for understanding new material, the teacher need spend far less time in boring review and special treatment of those who are behind. Moreover, when teachers share specific, well-defined curricular goals, they can address those goals cooperatively as a community, and cooperate to make sure that each child learns certain things in each grade as part of the gradual, mutli-year process of education. In such classrooms, in such schools, everybody learns more.

And, just as specific guidelines help a tutor diagnose what a disadvantaged child needs, so do they help teachers diagnose an advantaged child's academic progress. A teacher who knows exactly what the essentials are is in a position to demand those essentials from all students. Students, in turn, are able to understand what is expected of them, knowing that the teacher will be able to find out whether they have met those expectations. In short, the guidelines that permit accurate diagnosis also permit genuine accountability for everyone -- the child, the teacher, the school, the district, the state. Definite expectations and clear accountability focus everyone's performance. They help concentrate the mind.

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In the last IEA report on science achievement (1988), two nations of Western Europe were still using the local-choice system for determining school content. These were England and Holland. The other developed nations of Europe and Asia that were analyzed in the report were all core-knowledge countries. The percentage of schools that fell below the minimal standard in the best core-knowledge countries ranged between one and five percent. By contrast, the fairness ratings for Holland and England were respectively 16% and 19%.[17] (Remember, the fairness score for the United States was 30% of schools below standard.) Because of findings like these, England recently decided to switch to a core-knowledge system. That left Holland. Recently I learned that the Dutch have now decided to switch to a core-knowledge system.

To my mind, the only half-way persuasive argument left to American opponents of core knowledge is the idea that America is a much more diverse nation than all those other countries. But if the analyses of this essay are right, a diverse country has greater need of a core-knowledge system than does a homogeneous one -- for some of the same reasons that a disadvantaged child has greater need of it than an advantaged child. The tired idea of American exceptionalism seems increasingly outmoded in the modern world, where the educational needs of young children are everywhere very much the same. As I have learned from studying the curricula of Bavaria, France, Japan, and Sweden, there are far more similarities than differences in the most effective educational systems of the developed world.

Our persistence in following a purely local-choice arrangement for early education has created a conflict between traditional American attitudes and modern educational realities. Our sentimental attachment to American exceptionalism, our resistance to change when confronted with rising educational standards, are not different in principle from the resistance to change exhibited by Soviet and Chinese bureaucrats. Stubborn traditions may succeed in perpetuating themselves through powerful bureaucracies, but a persistence in old ways in the face of new circumstances cannot succeed in creating a better life for the people of a nation. In a conflict between outmoded theories and new historical realities, the reality principle may be tragically evaded, but it cannot be defeated.

Notes

1. W. Loban, Language Ability: Grades seven, eight, and nine, (Project No. 1131) University of California, Berkeley, March, 1964, as expanded and interpreted by Sticht, T.G., Beck, L.B., Hauke, R.N., Kleiman, G.M., & James, J.H., Auding and Reading: A Developmental Model, Alexandria, Virginia, Human Resources Research Organization, 1974; Chall, J.S., Families and Literacy, Final Report to the National Institute of Education, 1982, and especially, Chall, J. S., Jacobs, V.A., Baldwin. L.E., The Reading Crisis: Why Poor Children Fall Behind, Harvard University Press, Cambridge, MA, 1990.

2. Boulot, S. & Boyzon-Fradet, D., Les immigres et l'ecole: une course d'obstacles, Paris, 1988, pp. 54-58. Centre for Educational Research and Innovation, (CERI), Immigrants' Children At School, Paris, 1987, pp. 178-259.

3. James Comer, "Ignorance is Not Bliss," Parents Magazine, March 1991, p. 193. Professor Gates is an advisor to our Core Knowledge project.

4. E. D. Hirsch, Jr., "Towards a Centrist Curriculum: Two Kinds of Multiculturalism in Elementary School," typescript available from the Core Knowledge Foundation, 2012-B Morton Drive, Charlottesville, VA 22901.

5. International Association for the Evaluation of Educational Achievement (IEA), Science Achievement in Seventeen Countries: A Preliminary Report, Pergamon Press, Elmsford, NY, 1988. (See p. 5, No. 7, comparative statistics for 14-year-olds.) Compare the superior equality of opportunity of the following countries (p. 42). The figures are the percentages of schools below par. Finland, 2%; Hungary, 0%; Japan, 1%; Korea, 5%; Norway 1%; Sweden, 1%. France and Germany, which rank well in fairness, were not in this IEA report.

6. R. Kyle, ed., Reaching for Excellence: An Effective Schools Sourcebook, Washington, D.C., U. S. Government Printing Office, May, 1985. Purkey, S.C., and Smith, M. S., "Effective Schools: A Review," The Elementary School Journal, Vol. 83, pp. 427-542.

7. Quoted from the 1991 district guidelines of Lee County, Florida.

8. Summarized from the Core Knowledge Sequence, available from the Core Knowledge Foundation, 2012-B Morton Drive, Charlottesville, VA 22901. See below for more detailed discussion of the Core Knowledge Sequence.

9. The specificity of German core-knowledge guides can be seen in Amtsblatt des Bayerischen Staatministeriums fur Untericht und Kultur, Sondernummer 20, Einfuhrung des Lehrplans fur die bayerische Grundschulen, Munich, 1981.

10. W. Loban, Language Ability: Grades seven, eight, and nine, (Project No. 1131) University of California, Berkeley, March, 1964, as expanded and interpreted by Sticht, T.G., Beck, L.B., Hauke, R.N., Kleiman, G.M., & James, J.H., Auding and Reading: A Developmental Model, Alexandria, Virginia, Human Resources Research Organization, 1974; Chall, J.S., Families and literacy, Final Report to the National Institute of Education, 1982, and especially, Chall, J. S., Jacobs, V.A., Baldwin. L.E., The Reading Crisis: Why Poor Children Fall Behind, Harvard University Press, Cambridge, MA, 1990.

11. Constance Holden, "Head Start Enters Adulthood", Science, 247, March 23, 1990.

12. The best single source for a statistical data on Belgium, France, Germany, Luxembourg, the Netherlands, Sweden, and Switzerland may be found in the publication by Centre for Educational Research and Innovation (CERI), Immigrants' Children At School, Organization for Economic Co-operation and Development, Paris, 1987. The French studies have been the fullest. They show that, when all other factors are accounted for, the difference in performance between Third-World immigrant students and French students "decreased more or less markedly, although they did not disappear completely." This induced the authors to conclude that the French should try harder! And, according to news reports, that is exactly what they are doing with admirable success.

13. Marylou Tousignant, "Area Schools Struggle with Increasing Student Turnover," Washington Post, May 20, 1991, p.1.

14. E. D. Hirsch, Jr., "Common Misconceptions About Core Knowledge," obtainable from the Core Knowledge Foundation.

15. Beginning in the 1990-91 school year, the Three Oaks School in Ft. Myers, Florida successfully integrated the Core Knowledge Sequence into the school's curriculum. Other schools began implementation in the 1991-92 school year, including the Mohegan School (P.S. 67) in the South Bronx, with a predominantly African-American and Hispanic population. For reports on the success of the Three Oaks School, see Education Week (Nov. 20, 1991); Wall Street Journal (Sept. 6, 1991); and Life magazine (September 1991).

16. The Core Knowledge Resource Series: What Your First [through Sixth] Grader Needs to Know, ed. E. D. Hirsch, Jr. (Doubleday). All author's proceeds from the sale of these books go to the non-profit Core Knowledge Foundation, dedicated to excellence and fairness in elementary education for all children.

17. Science Achievement in Seventeen Countries, p.42.