CORE KNOWLEDGE CURRICULUM
Three-Year Analysis of Implementation and Effects in Five Schools

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The Center

Every child has the capacity to succeed in school and in life. Yet far too many children, especially those from poor and minority families, are placed at risk by school practices that are based on a sorting paradigm in which some students receive high-expectations instruction while the rest are relegated to lower quality education and lower quality futures. The sorting perspective must be replaced by a "talent development" model that asserts that all children are capable of succeeding in a rich and demanding curriculum with appropriate assistance and support.

The mission of the Center for Research on the Education of Students Placed At Risk (CRESPAR) is to conduct the research, development, evaluation, and dissemination needed to transform schooling for students placed at risk. The work of the Center is guided by three central themes — ensuring the success of all students at key development points, building on students' personal and cultural assets, and scaling up effective programs — and conducted through seven research and development programs and a program of institutional activities.

CRESPAR is organized as a partnership of Johns Hopkins University and Howard University, in collaboration with researchers at the University of California at Santa Barbara, University of California at Los Angeles, University of Chicago, Manpower Demonstration Research Corporation, University of Memphis, Haskell Indian Nations University, and University of Houston-Clear Lake.

CRESPAR is supported by the National Institute on the Education of At-Risk Students (At-Risk Institute), one of five institutes created by the Educational Research, Development, Dissemination and Improvement Act of 1994 and located within the Office of Educational Research and Improvement (OERI) at the U.S. Department of Education. The At-Risk Institute supports a range of research and development activities designed to improve the education of students at risk of educational failure because of limited English proficiency, poverty, race, geographic location, or economic disadvantage.

Abstract

This technical report presents third-year analyses of the progress of five Maryland elementary schools participating in a multi-school, multi-district implementation of the Core Knowledge curriculum (Hirsch, 1987, 1996). Third-year results are presented in the areas of implementation and outcomes. Factors clearly affecting implementation of Core Knowledge included the following:

- the availability and use of common planning time
- the care taken to induct new teachers into the Core curriculum
- level of success in negotiating any Core/local curriculum conflicts
- finding ways to use Core Knowledge that are supportive of the state's student testing program
- sustaining Core as a priority in the face of competing educational reforms, and
- continuing to acquire adequate resources after each school's two-year implementation grant expired.

Achievement outcomes were measured through two tests: the Comprehensive Test of Basic Skills, Fourth Edition (CTBS/4) and the Maryland School Performance Assessment Program (MSPAP). The relationship between the tests and the Core Knowledge curriculum was not tight, and individual school's level of implementation and outcome measures all varied between years one and three. However, the majority of the Core Knowledge schools posted three-year academic achievement gains in reading comprehension relative to their matched control peers as measured on the CTBS/4. In addition, during the three-year period of this study, third-grade students in Core schools showed greater gains on the more performance-based MSPAP than did their matched control schools or the mean of schools state-wide.

Acknowledgments

The authors would like to thank the teachers and principals of both the Core Knowledge and the control schools for allowing us to gather data in their schools. Without their high level of professionalism, this study would not have been possible.

This report is dedicated to the memory of John Hollifield who made collaboration and communication possible for so many years at CSOS.

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Introduction

> *participants will keep clearly in view the high stakes involved in their deliberations: breaking the cycle of illiteracy for deprived children; raising the living standard of families who have been illiterate; making our country more competitive in international markets; achieving greater social justice; enabling all citizens to participate in the political process; bringing us closer to the Ciceronian ideal of universal public discourse — in short, achieving fundamental goals of the Founders at the birth of the republic."*
>
> — E.D. Hirsch, Jr., in *Cultural Literacy* (1987, p. 145)

Studies of diverse school reform designs have indicated that, all other things being equal, a whole-school reform is more likely to have long-term achievement effects than is a reform targeted at specific subsets of students within schools, and that externally developed reforms are more likely to have positive effects on student achievement than are locally developed efforts (Stringfield et al., 1997; Nunnery, 1998). However, the same studies have demonstrated that not all nationally developed whole-school reforms produce positive effects, and that even those that appear to produce positive effects do not produce them uniformly. Issues of context and level of implementation strongly influence the "effectiveness" of any reform. Given such knowledge and given new federal funding streams to support "research-based" whole-school reforms (e.g., the 1998 Comprehensive School Reform Demonstration Program [CSRD], frequently referred to as Obey-Porter), it becomes very important to examine the implementability and effects of diverse reforms and to examine them in diverse contexts.

This report presents data from the first multi-site, multi-district, multi-year study of the effects of the Core Knowledge curriculum on students' achievement rates. As such, it begins the process of filling an information void on one of the largest of the national school reform movements. Core Knowledge has grown from an initial single school in 1989 to more than 600 today. For a review of research on this reform, see Herman (1999).

Core Knowledge is a phrase used by E.D. Hirsch (1987, 1996) to describe what he sees as a common core of information needed by all citizens in order to survive and prosper in a given culture. Hirsch has expressed concern that schools in the United States have drifted away from teaching all students a common core of knowledge. Hirsch argues that the result is a general lack of learning and a specific growth in the gap of necessary knowledge between the children of affluence and the children of various disadvantages, such as poverty and cultural difference.

Hirsch and his colleagues at the Core Knowledge Foundation have developed the *Core Knowledge Sequence* (Core Knowledge Foundation, 1993a, 1995, 1998) which specifies a common core of content for American schools and provides a planned sequential curriculum in language arts, history, geography, mathematics, science, visual arts, and music for students in kindergarten through grade six. The topics specified in the *Sequence* are further elaborated in a series of books, carrying the titles *What Your* [First, Second, etc.] *Grader Needs to Know* (Core Knowledge Foundation, 1991, 1992a, 1992b, 1993b, 1993c, 1996a, 1997). Together, the volumes form a spiraling curriculum designed to infuse one-half of each school day with "Core Knowledge." For example, in Core Knowledge, all first graders study Egyptian history and Japanese culture. In fourth grade, the study of world history and cultures is expanded to the early and medieval African kingdoms and medieval China.

Among the current generation of "whole-school" reforms, Core Knowledge is unique for several reasons. First among these is that Core Knowledge specifies a detailed curriculum framework throughout the entire kindergarten-through-grade-six range. None of the other national reform groups is so specific regarding such areas as literature, history, geography, or the arts. Second, Core Knowledge has been silent as to desired methods for instruction. Core does not tell teachers "how to teach." Third, Core is silent on implementation strategy. Hirsch and his colleagues are deliberately non-prescriptive as to "scale up" techniques, allowing each school to implement via their own chosen route.

One effect of this level of specificity regarding curricula and openness regarding methods has been that Core Knowledge has been able to spread rapidly, without having to develop a specific "scaling up" strategy for teaching teachers and schools how to "do" Core Knowledge.

In the spring of 1994, six Maryland schools began a pilot implementation of the *Core Knowledge Sequence*. In the first two years of the experiment, The Abell Foundation of Baltimore, Maryland provided each school with approximately $27,000 in start-up funding, and the staffs of Abell and the Maryland State Superintendent of Schools provided oversight and staff development activities to aid in the implementation. In year three, financial subsidies were ended and guidance was minimized. Abell's assumption became that the program would be sufficiently developed in the schools so that further outside assistance would not be needed.

The remaining sections of this report present information on the design of the Maryland Core Knowledge study, implementation findings, and data on student outcomes. Appendices provide detailed information on levels of implementation of specific Core Knowledge content.

Design of the Maryland Core Knowledge Study

Sample of Schools

Each of the six pilot schools was demographically matched with a similar, within-district school, so that each Core Knowledge school would have a reasonable control against which it could be compared. One of the original six Core Knowledge schools is no longer being studied because its matched control school became a Core Knowledge school in the 1995-96 school year. Therefore, the current study examines implementation and outcome data from five Core Knowledge schools and five matched controls. A demographic description of those five experimental and five matched control schools is provided in Table 1.

Table 1
Demographics of the Schools Participating in the Maryland Core Knowledge Study

Experimental or Control Pair	Enrollment (K-5)	Free/Reduced Lunch	Special Education	Location
Experimental 1	445	34.5%	7.7%	Urban
Control 1	420	51.9%	14.5%	Urban
Experimental 2	450	63.4%	11.1%	Urban
Control 2	380	67.8%	9.0%	Urban
Experimental 3	584	12.7%	11.7%	Suburban
Control 3	600	19.4%	12.9%	Suburban
Experimental 4	178	37.8%	11.2%	Rural
Control 4	198	24.4%	16.6%	Rural
Experimental 5	395	46.0%	15.2%	Rural
Control 5	415	36.9%	7.5%	Rural
Experimental Mean	410	38.9%	11.4%	
Control Mean	403	40.1%	12.1%	

Sample of Students

Two full cohorts of students in the Core Knowledge and the control schools were initially selected to be followed for three years. The CTBS/4 was administered to all first- and third-grade students in each pilot and each control school in the fall of 1994. These first- and third-grade students were retested with the CTBS/4 in the spring of 1995, in the spring of 1996 when they were in second and fourth grade, and in the spring of 1997 when

they were third and fifth graders. The four testing periods provide information about the cumulative effects of three years of Core Knowledge implementation.

As can be seen in Table 2, at the beginning of the study in the fall of 1994, a total of 1207 children were tested in the first and third grades combined. Full three-year data sets were available on 708 of these students in the spring of 1997. This study has longitudinal data on 59% of the total initial sample of experimental and 58% of total original sample of control students.

Table 2

Number of students in the study, originally and after 3 years

Pair	School Type	N of Students (Total 1st and 3rd Grades)		% of Original Sample
		Fall 94 Testing	3 Full Years of Data	
Pair 1	Experimental	142	73	51%
	Control	116	46	40%
Pair 2	Experimental	128	75	59%
	Control	100	49	49%
Pair 3	Experimental	196	128	65%
	Control	174	116	67%
Pair 4	Experimental	52	40	77%
	Control	44	36	82%
Pair 5	Experimental	129	64	50%
	Control	126	68	54%

Process-Implementation Measures

In the three years of the study, detailed classroom-level observations have been made in the Core Knowledge schools. Regular instruction and selected “specials” (art, music, library, computers) were observed. Over the three years of the study, a total of approximately 200 one-hour observations were conducted. Data collected provided evidence about the implementation of Core topics and classroom- and school-level effects of the Core curriculum. Where practical during these visits to schools, interviews with teachers and administrators were also conducted to gauge school staff perceptions of the ongoing innovation. In addition, researchers led focus groups with third- and fifth-grade teachers at each school during year three.

Also, in year three, a survey was sent to each regular classroom teacher and to each art and music teacher in the five schools to gain a broader overview of implementation issues and to assess the level of implementation of Core Knowledge across the schools. The questionnaire was divided into two parts. The first part asked teachers a range of questions related to the Core Knowledge implementation, including questions about the resources that have aided them in the implementation, the instructional methods used in their classrooms, and the time they spent teaching Core Knowledge topics. Most questions in the first section allowed teachers to respond with a choice of answers; others were open-ended. The second part of the survey listed the Core Knowledge topics in the 1995 *Core Knowledge Sequence*. Teachers were asked to check off each topic they had taught or planned to teach in the 1996-97 school year. The questionnaires allowed for anonymity; however, teachers were identified by school and by grade level. (See the *Technical Appendices* for more information.)

Outcome Measures

Two different tests, the Maryland School Performance Assessment Program (MSPAP) (Yen & Ferrara, 1997) and the Comprehensive Test of Basic Skills, Fourth Edition (CTBS/4) (CTB, 1991), were used in this evaluation. MSPAP is a performance-based assessment requiring extensive writing, problem solving, and occasional teamwork among students. Each spring the state of Maryland administers the test to all third-, fifth-, and eighth-grade public school students.

The CTBS/4 is a norm-referenced, multiple-choice test that has been found in a variety of studies to possess reasonable psychometric properties. It was chosen for this study, in part, because at the beginning of the evaluation all elementary schools in Maryland were required to administer it at certain grades. In the Maryland Core Knowledge study, the two subtests of Reading Comprehension and Mathematical Concepts and Applications are administered and reported each year. Those subtests are considered to be the more nearly "higher order" subtests in the CTBS/4's basic skills areas.

The Maryland School Performance Assessment Program is a "next generation" performance-based testing program. The test is given to all third, fifth, and eighth graders across the state. A total of approximately 150,000 students take the test each year. MSPAP covers six content areas: reading, writing, language usage, mathematics, science, and social studies. The first four are defined by Yen and Ferrara (1997) as follows:

> READING: The reading domain is defined by three purposes for reading reading for literary experience, for information, and to perform a task. (p. 62)
>
> WRITING: The writing domain is defined by three purposes for writing — to inform, persuade, and express personal ideas — and four steps in the writing process — prewriting/planning, drafting, revising, and proofreading. (p. 63)
>
> LANGUAGE USAGE: The single language usage outcome incorporates correctness and completeness features in the appropriate use of English conventions (e.g., punctuation, grammar, spelling) across a variety of writing purposes and styles. (p. 63)
>
> MATHEMATICS: The mathematics domain is defined by nine content outcomes and four process outcomes. The Maryland outcomes are a close adaptation of the widely known NCTM Curriculum and Evaluation Standards for School Mathematics (National Council of Teachers of Mathematics, 1989)…. The MSPAP open-ended mathematics tasks require students to solve multi-step problems; make decisions and recommendations; communicate their ideas, understanding, and reasoning in mathematics; and explain the processes they used to solve problems. (p. 64)

The final two areas, which were not summarized by Yen and Ferrara, are:

> SCIENCE: The science domain covers the content areas of life science, physical science, and earth/space science, and four process outcomes which include interpreting and explaining information, demonstrating ways of thinking inherent in science, using the processes of science, and applying science to solve problems.
>
> SOCIAL STUDIES: The social studies domain encompasses the content areas of political systems, geography, national and world history, and economics and the process outcomes of gathering, interpreting, and explaining information, demonstrating positive self-concept and empathy toward others, and expressing appropriate understanding and attitudes.

Implementation Issues

> *"I remember last year a lot of times [the students] would run around and play Power Rangers and chase each other around. But I remember one day after we were talking about Harriet Tubman, they were playing escaped slaves and slave catchers. They were still doing the same thing — chasing each other around. But their roles were different. They were using real-life situations from the past."*
>
> — Third-grade teacher

First-Year Implementation. The Core Knowledge implementation in the original six schools began in the summer of 1995. In each school a team of teachers rewrote their school's scope and sequence by integrating district and state requirements with Core Knowledge topics. Each school's scope and sequence was then submitted to the Maryland State Department of Education for review by experienced Core Knowledge teachers.

While teachers did develop some Core lessons before September 1995, most of the lesson-writing activities occurred throughout the school year. The Abell Foundation funds allowed schools to provide planning time, and in most of the schools, teachers worked in grade-level teams to research topics, find resources, and write lessons and assessments.

Because the Core Knowledge Foundation does not specify books, materials, lesson plans, or pedagogical strategies, the schools had to develop the Core curriculum without the aid of specific materials or guidance for instruction. This took a considerable amount of time. In addition, teachers reported being hindered in the development of lessons by the lack of age-appropriate resources. An additional obstacle was the necessity in many of the schools to teach their districts' curricula. Finding time to teach Core in a day already filled by teaching district requirements was a challenge to some schools. Finally, all schools were concerned with the demands of MSPAP and had to develop techniques and find time in the already tight schedule to prepare their students for the test.

Second-Year Implementation. Teachers reported that the second year of implementation was easier than the first. In year two, there was time for teachers to reflect on what had worked and what had not in the prior year. Changes were often made in the scope and sequence as schools shifted the order of the teaching of some of the Core Knowledge topics. In some schools these alterations were extensive. In the classroom, changes were made in the length and the depth of certain units, and lessons which teachers

felt had not worked well in the first year were revised. Additional rewriting was also necessitated by teachers finding new resources and researching topics further.

Four new factors that often hindered implementation of the Core Knowledge curriculum appeared in year two. These were:

1. challenges in training and incorporating new, non-Core-Knowledge-trained teachers;
2. problems associated with teaching split-grade classes in the presence of clear, grade-specific curricula;
3. a general shortage of time for individual and team planning; and
4. a shortage of money (as Abell Foundation funds were reduced) to purchase new (or replace worn or lost) materials.

Two problems that had existed in year one were even more pronounced in year two:

1. conflicts between Core Knowledge and some of the districts' pre-existing curricular requirements made it difficult for some of the schools to teach all of the Core topics; and
2. preparing students for MSPAP became the central emphasis in all schools in the study (for discussion, see Stringfield & McHugh, 1997).

Third-Year Implementation. The third year of implementation was characterized by a greater differentiation between implementation levels among the five Maryland Core Knowledge schools. Two schools were well on their way to institutionalizing Core Knowledge, one school showed signs of diminished implementation, and two schools faced circumstances that threatened their ability to fully integrate Core Knowledge.

Through the teacher survey and our interviews with principals and teachers, we have identified issues that appear to have affected these varying levels of implementation in the third year. The two highly implementing schools continued to provide planning time to teachers, had low teacher turnover, and were not compelled to teach their districts' curricula. The school in which Core Knowledge implementation had decreased had a large number of teachers retire and was required to use its district's curriculum. In the two schools in which Core Knowledge implementation was most endangered, one began the implementation of a different major reform, thus eliminating much of the time necessary to incorporate Core Knowledge content, and the other lost its ability to choose its own educational plan because it was designated by the State Department of Education as being "eligible for reconstitution" under the state's expanding accountability mandates.

In the following section we discuss further the issues of implementation that occurred during the three years.

Common Planning Time

Common planning time among teachers was a feature which facilitated the successful implementation of Core Knowledge. Being able to share ideas and the workload with other teachers of the same grade level lightened the burden, especially in years one and two. As one teacher commented, “I’m typically a very independent person. Coming here and having to work as a team my first year was very awkward for me. But I can’t imagine doing Core without it.”

The results of the teacher survey are consistent with this view. In those schools in which common planning time was provided, 77% of the teachers viewed the time as either “essential” or helpful “to a great extent.” Only 2% (i.e., one teacher) did not find common planning beneficial.

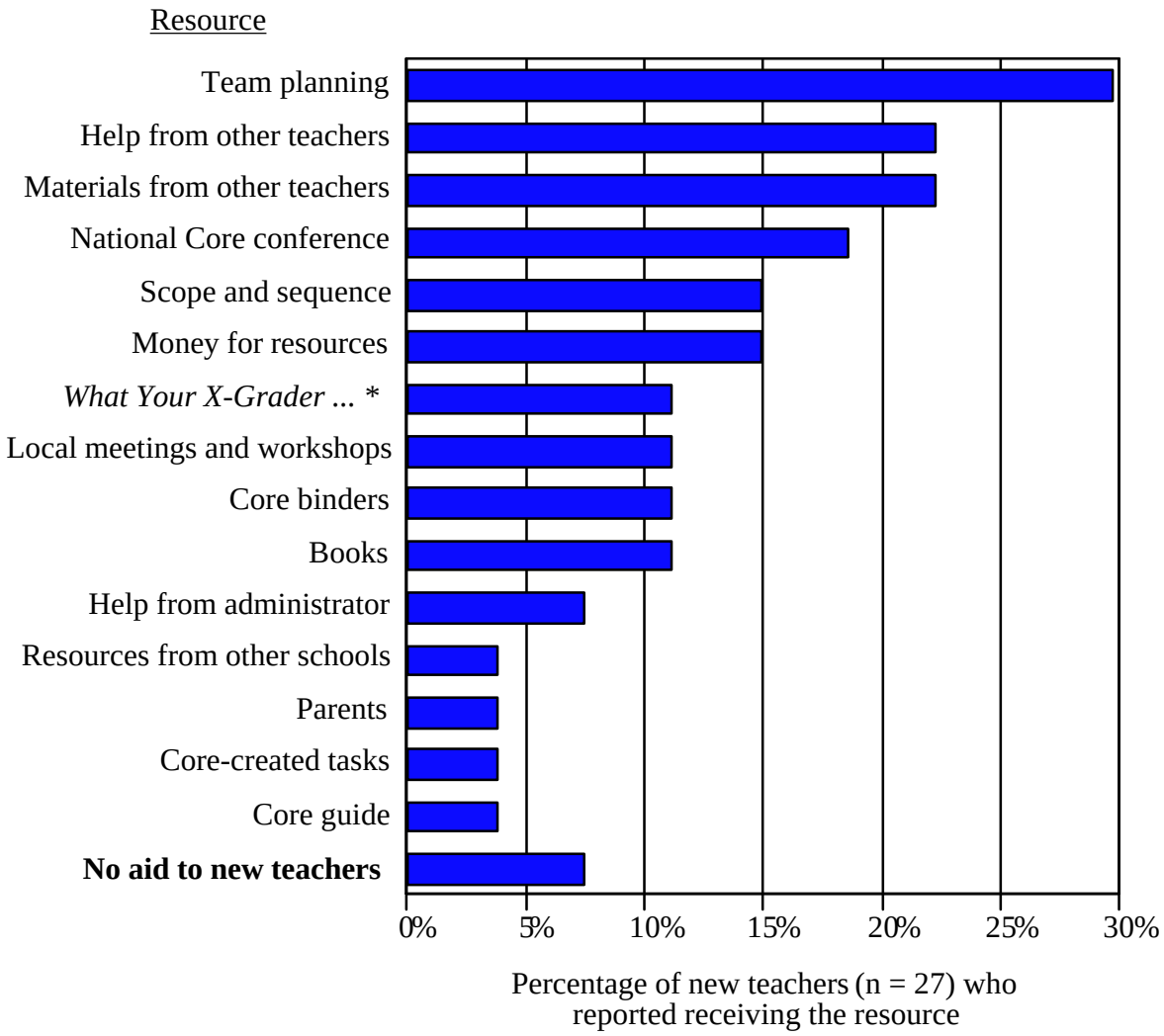
Teachers New to the School or to the Grade

Teachers new to a school had difficulty implementing Core Knowledge. The staff development time and funding available in years one and two had greatly diminished in year three. In addition, in many cases the previous teacher had left no Core Knowledge lesson plans, assessments, or resources. This lack of curriculum materials also affected teachers who changed grades.

There appeared to be no specific structured method of training new teachers or assuring that curriculum materials bought through Core Knowledge specific grants remained at any school. Although some schools developed methods of accumulating materials into “binders” or “logs,” this process of documenting the curriculum was not used in all schools. When it was used, these valuable records were sometimes incomplete. In some schools there was no attempt to integrate new teachers into Core Knowledge. As one first-year teacher commented, “All I know about [Core Knowledge] is that there’s that book for each grade and those are the things you are supposed to cover. That’s all I really

Figure 1

Type of assistance or resources which were provided to teachers new to the school or new to the grade



* The Core Knowledge Foundation publishes a series of grade-specific books on the Core Knowledge Sequence. The titles of the books are *What Y*our *First [Second, etc.] Grader Needs to Know* (Hirsch, various dates).

Comments from the teacher focus groups revealed that, for the most part, it was the unspoken responsibility of experienced Core teachers to train and assist new teachers. This perception was corroborated by the results of the teachers' survey. On the survey, we asked teachers new to the school or to a grade to list assistance or resources that were provided to help in the implementation of Core Knowledge. Figure 1 shows their responses. The three most-often cited resources revolved around assistance from other teachers. Thirty

percent of new teachers listed team planning, 22% listed help from other teachers, and 22% listed materials from other teachers. Seven percent wrote that they had received no assistance at all.

On the teacher survey we asked teachers to list school, district, or state requirements that competed with Core Knowledge for space in the curriculum. Of the teachers who responded to this question, 64% listed district requirements as impediments to full implementation of Core Knowledge. The second and third most often noted obstacles were MSPAP at 27% and another educational reform at 11%. These three will be discussed next.

District Curriculum

Of primary importance in the ability of a school to adequately implement Core Knowledge is the degree to which it is allowed to deviate from their district's pre-existing curriculum. The Core Knowledge Foundation estimates that the Core Knowledge sequence should be the basis of about 50% of a school's curriculum. For schools required to teach all

culum, there simply was not sufficient time to satisfactorily implement Core Knowledge. Conversely, for schools in districts that were more flexible, teachers were better able to cover more Core Knowledge content. In our study those more flexible districts were also relatively small.

One teacher described her frustration in trying to meld Core Knowledge with the district-mandated curriculum. "We have a curriculum, and we're held accountable to that, as we all know, through MSPAP. I'm very, very torn because I feel I have to get this in and the Core curriculum is very ... it's challenging, it's enriching, it's stimulating. But you have to constantly balance and weigh what to do, and we can't get everything in. And that's just

In one school, there were growing numbers of teachers who viewed the Core Knowledge sequence as supplemental to the district curriculum. As one second-year teacher commented,

> I did not do a lot of Core this year, but I really used it to enrich my social studies or my English units. And I just think that if you're going to implement Core in a school, if you just don't have a strong curriculum to begin with, then maybe that's something that would be a useful curriculum to have as a base. But, this [Core] was really a supplementary curriculum.

Within this study, when conflicts between central administration and the Core Knowledge curriculum were not clearly resolved in favor of the Core Knowledge curriculum, eventually the local curriculum predominated.

Maryland School Performance Assessment Program (MSPAP)

MSPAP was designed by the state of Maryland to assess students' ability to apply basic knowledge to "show that they understand reading selections, can develop written responses, solve multi-step mathematics problems, conduct science investigations, and demonstrate their understanding of social studies concepts" (Maryland State Department of Education, 1996, p. 2). The test is part of the Maryland School Performance Program, which holds individual schools accountable for student performance. Declines in a school's MSPAP scores may bring serious repercussions. MSPAP is taken very seriously by Maryland educators.

Adapting teaching styles to prepare students for MSPAP has been a dominant reform in the five Core Knowledge schools. However, during third-year interviews, teachers expressed two divergent views of the effect of MSPAP on Core Knowledge. Some teachers felt that MSPAP actually enhanced the Core Knowledge curriculum. Others felt that writing and administering non-Core performance tasks to prepare students for the test took time away from Core Knowledge.

Many teachers, separately and in teams, had developed performance assessment tasks using Core Knowledge as the content area. One teacher made the following comments about the MSPAP-Core Knowledge connection. "I don't think that Core takes anything away from MSPAP. To me, MSPAP is thinking skills; it's going from content to application. When you teach the content, you are doing performance-based teaching and performance-based assessment. Core is an enhancement [to this process]." A teacher at another school stated that there was a synergistic effect between Core Knowledge and MSPAP. Many of the reading materials on Core Knowledge topics that were available for her third-grade students were written for older students. She worked through the text with her class because of the difficulty. However, she felt that tackling this difficult material improved the children's vocabulary and reading ability and prepared them to read text on MSPAP. "So that when May comes and they get the MSPAP book and they have to read text that they have never seen before, which is going to be on third-grade level because it's developmentally appropriate, it seems easy."

Some teachers who agreed with this view of the facility of Core Knowledge to positively impact MSPAP still felt overwhelmed by the preparation for and consequences of the state test. One teacher voiced her frustrations about directives to "use these MSPAP

words; do these MSPAP-type activities…. It's always trying to teach in a MSPAP way, in a MSPAP style, with MSPAP in mind." She added, "And then go to your mailbox every day and get that one more thing, one more meeting. Every meeting that we have is related to MSPAP in some way, shape, or form. It's ever-present." Another teacher who had successfully used Core Knowledge content as a vehicle for teaching students the processes and outcomes that are tested by MSPAP still felt weighed down by the test. She commented, "MSPAP always scares me. I'm really worried about that. I just sometimes feel inferior, just inadequate. Did I do the right thing and did I do a good job? A long time ago when I started teaching, I didn't have that feeling. I didn't go home questioning myself. I'm just not feeling good about myself."

Teachers in every school in the study expressed worry about the consequences of MSPAP scores. As one teacher put it, "I don't know how our district officials really feel about [Core Knowledge], but if scores don't go up soon, I assume
reason why they're not, and I could easily see that Core's going to have to go and they're

The potential of MSPAP to derail Core Knowledge in Maryland schools was best illustrated by one of the pilot schools which, because scores on MSPAP had not increased, was declared by the State Department of Education to be eligible for reconstitution. After this decision, state and district people worked closely with the school to restructure educational delivery, and Core Knowledge was not a part of either the state's or the [1] It was with great difficulty that some teachers in this school hung on to Core Knowledge. As one teacher commented:

> We have so many things that we have to do to meet state outcomes and guidelines. We have a state person who shows up sometimes to see that we are on task according to our building plan. Then we have the city, and they're telling us that we need to do this, and we need to do that. It makes it very difficult and very overwhelming. But before reconstitution, when we first initiated Core, everybody in the building loved it. We still love it. It's just that when you are divided in three different ways, it's very difficult.

The alignment between the content-rich Core Knowledge curriculum and the skills-based MSPAP test is far from perfect. Without an accommodation, over the long term, MSPAP-related activities predominated.

A New Reform

[1] Paradoxically, the State Superintendent of Education remains a vocal supporter of Core Knowledge.

In the 1996-97 school year, one of the original Maryland Core Knowledge pilot schools became part of a group of schools implementing a major curricular reform which significantly altered the instructional delivery of every teacher in the building. Although Core Knowledge is scheduled to be a part of that program, the major emphasis in 1996-97 was on the reading program. The teachers in that school reported that the time demands of the new reform seriously interfered with their ability to implement Core Knowledge. A typical teacher observed:

> My reading block on Mondays and Fridays is from 8:30 to 10:00. On Tuesdays, Wednesdays, and Thursdays, it's 8:30 to 10:40. So that's a long time for reading, and once you've finished that, you have to do language and then math and then you do social studies. And we're focusing two days a week on the MSPAP activities. So, therefore, you don't have that long afternoon that we used to use to implement Core.

Attempting a new reform before a previous one is fully institutionalized is generally a step that jeopardizes the earlier reform (Stringfield et al., 1997). Our Core Knowledge implementation data are consistent with this earlier finding.

Increased Enrollment

Enrollment grew in some of the Core Knowledge schools. With increasing numbers of students coming into a grade, new classrooms were added. This necessitated either hiring a teacher new to the school or transferring a teacher from another grade. The result was either acclimating an existing Core Knowledge teacher to the materials and curriculum of a new grade or training a teacher new to the building and probably new to Core Knowledge.

The increase in the number of students also necessitated the purchase of additional materials. This came at a time when funding for such purposes was uncertain to nonexistent.

New Resources Needed

By the end of year three, additional funding was needed to purchase additional resources or to replenish materials that had worn out. Paperback books bought in the initial year of implementation were deteriorating and needed to be replaced. Materials to convert science lessons to hands-on activities were needed in every school. In addition, with three years of experience, some teachers found that books and materials purchased in the first year were not as helpful as they had first hoped.

Most schools had relied heavily on photocopying materials while developing Core Knowledge units. One teacher stated that the most necessary resource in developing the Core Knowledge curriculum was a photocopier. However, two schools did not have photocopiers, and the teachers in those schools noted how the lack of that resource hampered them in developing units.

> We are three years away from the year 2000 and you can't expect to teach with things invented in the forties. It's impossible. I would rather have access to the photocopy machine using tasks that I have developed for the MSPAP than have a textbook.

As Abell Foundation funding terminated, local school districts did not replace the grant money. Schools reported finding it difficult to reallocate within-school funds for Core purposes. However, some principals were successful in raising extra money to fund common planning time, purchase some new resources, and pay for travel costs to the national Core Knowledge conference.

> *"I really believe that the students are benefiting from Core with getting life-long knowledge that they can tap into later. The knowledge they obtain has shelf life. It's something that they can get when they need it," said one teacher.*
>
> A second teacher added, "*And because it's multicultural, it gives them more than one shelf."*

Teacher Survey on Implementation

This section highlights the teacher survey responses that provide more detail about the problem of implementation in the Core Knowledge schools.

The survey data show that teachers in the five Core Knowledge schools were, on average, an experienced group. The teachers had a median of 10 years of teaching experience and had spent an average of five years teaching at their current schools. The majority did not have to cope with the substantial demands of being new teachers, nor were they at the point in their careers (20+ years of teaching) when Huberman (1989) found that teachers were less likely to embark on new school improvement efforts.

How much time was spent teaching Core Knowledge?

The Core Knowledge Foundation recommends that the Core Knowledge curriculum comprise approximately 50% of what is taught in Core Knowledge schools. In our survey of teachers, we found that teachers spent an average of 53% of their time each week teaching Core Knowledge content.

How much time was spent each week developing or revising the Core Knowledge curriculum?

The third-year survey results revealed that, across sites, teachers spent an average of four hours a week developing or revising the Core Knowledge curriculum.

In our interviews and focus groups, we found that in the third year of implementation teachers reported that they were spending far less time developing the Core Knowledge curriculum than in year two and less time than in year one. The teachers in the highly implementing schools described year three as a period of refinement, even cutting back. "It's almost to the point where we've gathered so much, now we have to start condensing it down because we've got too much." In the other schools, competing demands kept teachers from working on Core Knowledge.

How difficult was it to find age-appropriate materials for the Core Knowledge curriculum?

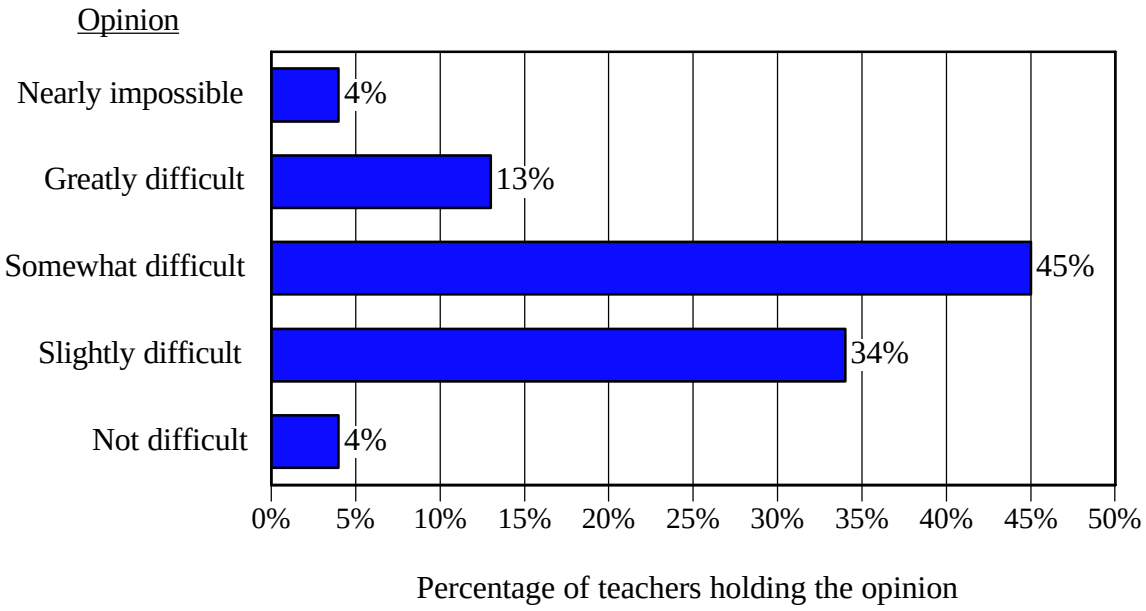
One of the first-year complaints of teachers was the difficulty they had in finding age-appropriate materials related to Core Knowledge topics. However, this was not an overwhelming problem in year three. As can be seen in Figure 2, although some teachers reported problems in finding materials designed for their grade, fewer than one in five (17%) reported that they felt that it was "greatly difficult" or "nearly impossible" to find materials.

What instructional materials did teachers most often use to teach Core Knowledge material?

In our visits to schools, we observed a wide variety of instructional materials for teaching Core Knowledge. In the survey, we asked teachers to rank the three types of instructional materials they used most often. Forty-nine percent of the teachers wrote that they used "teacher-made materials" most often. Trade books ranked number two and worksheets number three.

Figure 2

Teacher opinions about the difficulty of finding age-appropriate materials for the Core Knowledge curriculum



What instructional techniques did teachers use to teach reading?

The Core Knowledge Sequence provides content guidelines for language arts but leaves the decision of how to teach reading up to the individual schools or teachers. We were interested in which methods teachers used to teach reading to their students. In our survey, we asked teachers to briefly describe how they taught reading and to name their school's reading series.

We found that teachers taught reading through a combination of approaches. The teaching methods used were fairly consistent within a school. For example, in one school Direct Instruction (Bereiter & Englemann, 1966; Abt Associates, 1977; Meyer, 1984) was used by most teachers, and in another school basals and whole language were employed. The teacher reports across sites revealed that 43% of the teachers used phonics, 46% used whole language, 61% used basals, 41% used literature-based techniques, and 9% used Direct Instruction. (Most teachers reported using more than one approach.)

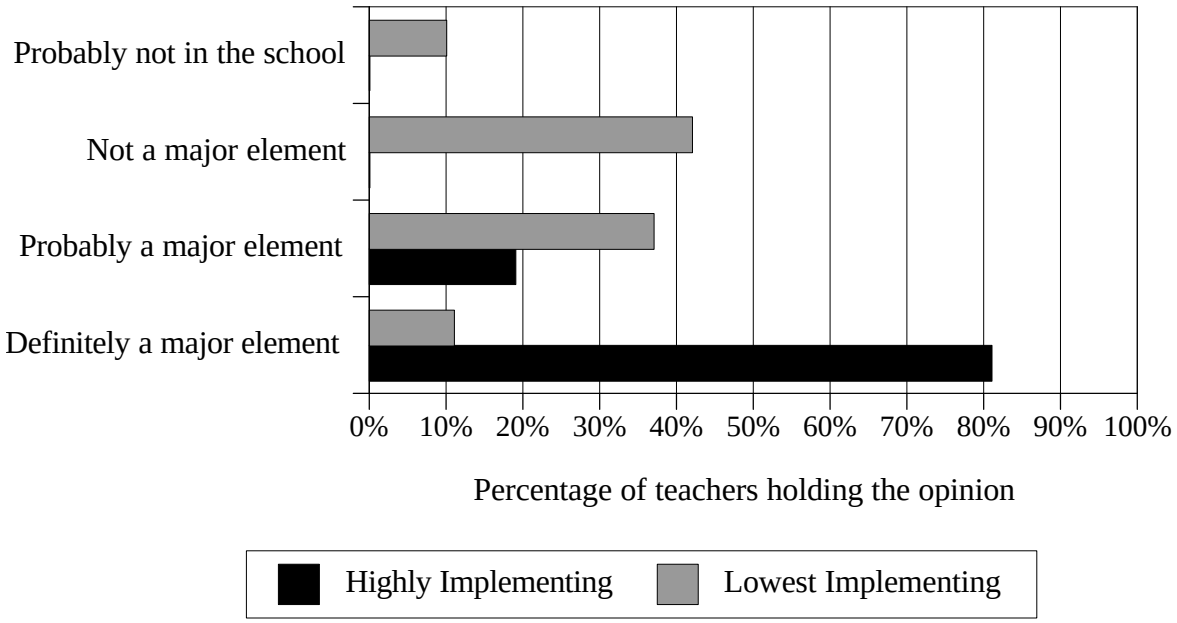
The reading series used most often by schools was the Harcourt, Brace *Treasury of Literature* (Harcourt, Brace & Company, 1993). It was used by 21 of the 45 teachers reporting. The next most often used reading resources were trade books, which 19 of the 45 teachers reported using.

Will Core Knowledge still be implemented in the year 2000?

Our survey asked teachers to respond to the question, "How confident are you that Core Knowledge will be a major element in your school's curriculum in the year 2000?" The teachers at the two strongest implementation sites were more optimistic than the teachers at the two lowest implementation sites that Core Knowledge would be a significant component of the curriculum in three years. As can be seen in Figure 3, 81% of the teachers in the two highly implementing schools reported their belief that Core Knowledge would definitely be a major element. By contrast, only 11% of teachers in the two lower implementing schools were confident that Core Knowledge would be a dominant portion of the curriculum in the future.

Figure 3

Opinions of teachers in the two *highly implementing* schools and in the two *lowest implementing* schools about the likelihood that Core Knowledge will be a major element in their school's curriculum in the year 2000



What resources did teachers receive each year to help in the implementation of Core Knowledge?

Through analyses of the qualitative interview and observational data collected in the first two years of the evaluation, we found that there were a number of factors that facilitated successful early implementation, including extra funding for start up, common planning time, and attendance at the Core Knowledge National Conference (Stringfield & McHugh, 1997). Because we believed these and other elements were important resources that might help teachers implement Core Knowledge, we included a section in our year-three survey that asked teachers whether or not particular implementation resources were characteristic of their experience in implementing Core Knowledge. The following emerged.

Involvement in the Core Knowledge national network. The large majority (96%) of teachers had been provided with a copy of *What Your [X] Grader Needs to Know* during the three years. The majority (84%) also received copies of the *Core Knowledge Sequence: Content Guidelines for Grades K-6* (Core Knowledge Foundation, 1993, 1995). However, relatively few teachers (22%) had received copies of the *Core Knowledge Resource Guide*, which was revised, renamed, and published as *Books to Build On* (Core Knowledge Foundation, 1996b). Dissemination of the *Core Knowledge Foundation Newsletter* among teachers had declined from 32% of the teachers in 1994-95, to 24% in 1995-96, and to only 13% in 1996-97.

One possible method for improving one's Core-related knowledge and restoring motivation could be through attendance at the Core Knowledge National Conference. Over the three years, the highest percentage (46%) of teachers attended the national meeting which was held in the first year of implementation in March 1995. The meeting was held in nearby Williamsburg, Virginia, and foundation support was at its highest. There were slightly fewer teachers (40%) who attended the March 1996 meeting which was held even more conveniently in Baltimore. Fewer still (29%) went to the meeting in March 1997 in Denver, Colorado. Start-up funds apparently facilitated the participation in year one, and distance/costs combined with a lack of external support hampered attendance in year three. Attendance at local meetings concerned with Core Knowledge also declined somewhat over the three years of implementation, from 40% in year one to 24% in year three.

Another way in which teachers participated in the Core Knowledge network was through visits from teachers from other schools and through taking trips to other schools. These visits allowed for cross-school teacher communication. In the first year of implementation, 70% of the teachers reported that they made a trip to another Core Knowledge school. This figure had declined to 17% in year three. The percentage of

teachers who received visitors from other Core Knowledge schools showed a less substantial decline, from 84% in year one to 56% in year three.

Systemic support. Systemic support for the implementation of Core Knowledge could be one resource for teachers. The third-year survey data indicated that teachers received very strong support at the school-site level from principals and other school personnel, such as the librarian or curriculum coordinator. The active involvement of other school personnel has remained constant throughout the three years, with 76% of the teachers receiving aid in year one and 71% in year three. On average, teachers perceived that support from their school's principal remained high but had declined slightly over the years, from 89% in year one to 78% in year three.

The active support of the principal was viewed by the teachers as extremely valuable. One teacher explained. "It's important to have that administrative backing to feel that you are doing right as a teacher, to feel that you are doing good and doing what you're supposed to be doing. You've got to have that positive feedback, and if you aren't getting it from your principal, [the Core Knowledge implementation] is going to suffer." Teachers in more than one school expressed the belief that if the principal were to leave, the Core Knowledge program would die.

While teachers considered support within a school to be strong, across sites they reported that explicit support for Core Knowledge from the district office was quite low. Only 22% of teachers reported receiving their district's support in year one, and this number declined to 17% in year three.

School infrastructure to support Core Knowledge. Teachers were asked a series of questions about the resources present in their school that might constitute an infrastructure to support the implementation of Core Knowledge. The Abell Foundation provided $22,000 to each school in year one and $5,000 in year two. Ninety-five percent of teachers reported an awareness that their schools had received grant money in year one. In year two, the percentage of teachers who reported that their school received grant money dropped to 69%, and this percentage declined to 24% in year three. While the Abell funding had ended after two years, some principals were successful in finding alternative sources of money for the Core Knowledge program.

At the beginning of the Maryland Core Knowledge pilot program, The Abell Foundation and the State Superintendent's staff strongly suggested that each school develop a Core Knowledge resource center. Roughly 35% of the teachers (most of whom were from two of the five schools) reported that such a facility existed at their school. One teacher explained the reluctance of teachers to create such a center.

> I remember going round and round about making a Core resource room, and people weren't willing to put the things that they had purchased in there because they would walk or not be back, and what would happen if they needed to use them at the same time as somebody else needed to use them. I guess in a way we're all really protective of our things.

One facility that existed at each school was a library, and 66% of teachers reported that over the three years they had used their school's library specifically for the Core Knowledge implementation.

We surveyed teachers about whether resources were being committed to staff development and planning time for Core Knowledge. Table 3 details the responses. While there was a drop from year one to year three for each of the four resources, the percentage of teachers who participated in staff development and planning time reveals a continued commitment from principals to find the money to fund such endeavors.

Table 3
Staff development and planning which teachers received during the three years of Core Knowledge implementation

	Percentage of teachers receiving the resource		
Resource	1994-95	1995-96	1996-97
Staff development	97%	38%	31%
Extra planning time during the school year	70%	51%	56%
Common planning time	65%	60%	58%
Paid summer planning time	57%	29%	31%

Would teachers recommend Core Knowledge to their colleagues?

We asked teachers to respond to the following open-ended question: "If you were asked for advice from a friend who teaches at a school considering using the Core Knowledge curriculum, what would you say?" The most common response of teachers in the two highest implementing schools was "Go for it!" Teachers in the other three schools also voiced enthusiasm for Core Knowledge, but they offered more caveats.

Reasons that teachers across all five schools cited to adopt Core Knowledge included the richness of the content, the exposure to topics that develop students' appreciation for other cultures, the students' enthusiasm and interest in the Core topics, the facility to use the Core content to teach higher-order thinking skills, and the ownership of the curriculum

felt by the teachers because they had been free to develop the lessons and assessments themselves.

Teachers' cautions centered around the amount of work involved in developing the program (especially in year one), insufficient funds for resources to develop the curriculum, the introduction of new programs, and the absence of planning periods. The comments of some teachers reflected their frustration at inadequate implementation of Core in their schools. This is perhaps best summarized by the following comment:

> I would tell my friend that if the school is not committed to make Core a priority it is a lot of unnecessary work…. I would also say that the content is excellent. If done PROPERLY it would be a great program/curriculum for our students.

Teacher Survey on Core Knowledge Content Coverage

As part of our April 1997 survey of regular classroom teachers in grades one through five and art and music teachers, we included ALL topics listed in the *Core Knowledge Sequence* for each grade level. Teachers were asked to indicate which topics they had taught or planned to teach during the 1996-97 school year. We could not know from the survey in what depth teachers covered particular content areas, only whether they reported covering the various topics.

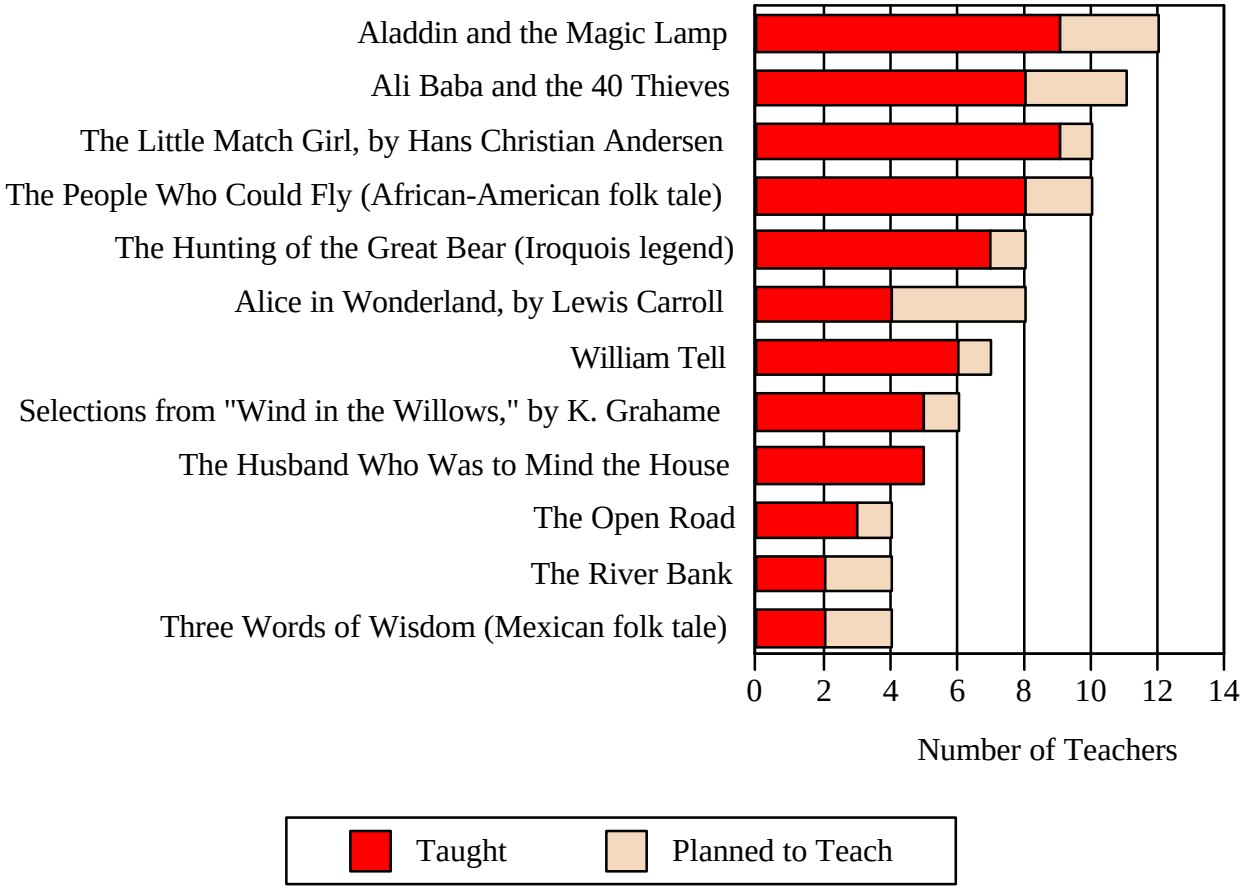
We generated graphs for each content area in each grade level. These graphs may be seen in the Technical Appendices. However, we present an illustrative graph as Figure 4 which shows the coverage of the stories listed in the *Core Knowledge Sequence* by third-grade teachers. There were fourteen teachers who returned the survey who were responsible for teaching stories in grade three. The most often taught story in this grade was "Aladdin and the Magic Lamp." At the time of the survey (April), nine teachers had taught the story and another three teachers planned to teach it. One of the least taught stories was "Three Words of Wisdom." Only two teachers had taught it and only two more planned to teach it.

From the topic checklists in the survey we also developed tables which summarize content coverage aggregated by grade and by school. In general, Core Knowledge content coverage declined as the grade level increased. Core coverage varied across the five schools.

As shown in Table 4, the greatest coverage of Core Knowledge topics was accomplished in grades one and two. Beginning in third grade, fewer Core topics were taught. These numbers match the observations of teachers and principals that district curriculum is fairly "content free" in the early grades. It becomes more difficult in Maryland to incorporate Core Knowledge topics in grades three through five because of competing district requirements and state testing pressures.

Figure 4

Number of third-grade teachers who taught or planned to teach Core Knowledge stories



Note: There were a total of 14 third-grade teachers in the schools surveyed, all of whom returned questionnaires. Of those 14 teachers, all were responsible for teaching in this content area.

Table 4 reveals that the subjects in which the greatest number of Core topics were taught were language arts (93%) and mathematics (89%). However, these numbers do not reflect a high level of implementation. On the contrary, teachers reported during interviews that they did not implement specific units of Core language arts or mathematics because

they perceived it was not necessary. Teachers believed that there was a sufficient number of mathematics and language Core topics already included in their districts' curricula.

Table 4

Percentages, *by grade,* of Core Knowledge content items that teachers reported they had taught or were planning to teach during the 1996-97 school year

Content Area	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	All Grades
Poems	61%	73%	41%	60%	50%	57%
Speeches	-----	-----	-----	59%	57%	58%
Mythology	-----	68%	58%	72%	43%	63%
Geography	83%	83%	59%	56%	55%	66%
Stories	84%	72%	53%	63%	53%	68%
Science	79%	88%	70%	50%	67%	68%
Sayings	73%	88%	78%	70%	53%	71%
World Civilization	85%	74%	84%	65%	58%	73%
American Civilization	84%	80%	78%	61%	70%	74%
Literature	85%	82%	100%	94%	79%	86%
Mathematics	97%	97%	84%	81%	97%	89%
Language	100%	97%	97%	89%	82%	93%
Mean Grade Percentage	84%	82%	74%	66%	67%	74%

Table 5 shows content coverage by school. The schools which exhibited the greatest challenges to implementation, as revealed through observations, interviews, and focus groups, are also those whose teachers reported the fewest number of Core topics taught.

Data from Table 5 indicate that, after three years, level of implementation ranged from virtually total (95%) to about half (52%). When language and mathematics are excluded from consideration, implementation ranged from 95% to 44%.

The two schools with a mean school implementation percentage of 89% and 95% for all subjects are discussed at various points in this report as high-implementation schools. The two schools with 54% and 44% implementation are discussed as relatively low implementation sites.

Table 5

Percentages, *by school,* of Core Knowledge content items that teachers reported they had taught or planned to teach during the 1996-97 school year

Content Area	School A	School B	School C	School D	School E
Poems	83%	83%	28%	62%	31%
Sayings	99%	100%	42%	70%	51%
Stories	85%	82%	58%	57%	46%
Mythology	98%	100%	58%	49%	36%
Speeches	100%	100%	0%	75%	50%
Language	99%	93%	91%	91%	92%
Literature	97%	100%	95%	66%	53%
World Civilization	93%	80%	73%	54%	52%
American Civilization	100%	94%	59%	48%	53%
Geography	100%	84%	72%	21%	42%
Science	98%	96%	72%	37%	25%
Mathematics	91%	96%	94%	84%	79%
Mean School Percentage	95%	89%	67%	58%	52%
Mean School Percentage excluding Language and Mathematics	95%	92%	56%	54%	44%

Student Academic Outcome Data

> *"What type of curriculum works best, with which students, is an empirical question, and it is time we answered it empirically."*
>
> — Ed Zeigler, *Education Week,* June 17, 1998

We examined academic outcomes using the Comprehensive Test of Basic Skills, Fourth Edition (CTBS/4) and the Maryland School Performance Assessment Program (MSPAP). Neither test is designed for, nor deliberately aligned with, the Core Knowledge curriculum. To that extent each measure becomes a demanding, but not highly specific, test of the topics taught in Core Knowledge. However, the theory underlying Core Knowledge

is that adding specific content to curriculum will increase the literacy of American students. Therefore, based on the promises inherent in the reform itself, we have used the CTBS/4 and the MSPAP to gauge if the implementation of Core Knowledge increases knowledge, specifically in the areas of reading comprehension and the ability to apply basic knowledge to show understanding in reading selections, develop written responses, solve multi-step mathematics problems, conduct science investigations, and demonstrate understanding of social studies concepts.

CTBS/4 Results

The CTBS/4 was given in the fall and spring of the 1994-1995 school year in grades one and three in experimental and matched control schools. Grades one and three were chosen to provide longitudinal coverage of all elementary grades while providing an overlap, at grade three, within three years. The fall administration provided a pre-test score and the spring administration provided a year-one measure. The CTBS/4 was again given to these same children in the spring of 1996 when they were in second and fourth grade and in the spring of 1997 when they were third and fifth graders. The data summarized in this report are based on the gains made by these students from the first test in the fall of 1994 to the spring test of 1997.

Results of the reading comprehension subtest of the CTBS/4 are presented in this section. We have also been tracking changes in the CTBS/4 mathematics concepts and applications subtest. We did not include any analysis of the mathematics results in this section because the Core schools did not change their mathematics curricula as a result of the Core Knowledge implementation. However, for informational purposes only, the mathematics results are presented in the Appendix.

It would be preferable to use multi-level modeling (Bryk, Raudenbush, & Congdon, 1994) for performing quantitative statistical analyses on this data set. However, this option is implausible because only five, and in some instances four, schools are available for analysis. Therefore, the statistical analyses reported in the following section will use the student as the level of analysis. Analyses will examine spring 1997 test scores, with fall 1994 measures on the same instruments as co-variates.

As can be seen in Table 6, school-level changes from fall of first grade to spring of third-grade in CTBS/4 Reading Comprehension exhibited a net mean gain of 4.8 NCEs[3] at

[3] The Normal Curve Equivalent, or NCE, scale is an equal distribution scale with a mean of 50 and a standard deviation of 21.06. NCE scores are equal to percentiles at the first, fiftieth, and ninth-ninth percentiles.

the five Core Knowledge schools. The size of the change varied greatly among the five Core Knowledge sites and among the five control schools. The Core Knowledge schools produced greater gains than their matched control schools in four of five cases. However, the difference in gains so greatly favored the control school in Pair E (the site at which teachers reported the lowest levels of Core implementation) that the whole-group mean increase was lower for Core Knowledge than for control schools (+4.8 NCEs versus +6.4 NCEs).

Table 6

Average NCE gains in CTBS *Reading Comprehension* for students moving from *first through third* grade

	Pair A	Pair B	Pair C	Pair D	Pair E	Mean School Change	Mean School Change Without Pair E
Core Knowledge	8.2	5.2	13.8	5.2	-8.4	4.8	8.1
Control	5.6	-3.6	12.0	2.7	15.6	6.4	4.2

At grade five, the CTBS/4 results were also uneven. Table 7 indicates that, on average, the Core Knowledge schools produced somewhat higher gains in reading than did control schools (+0.4 NCE gain vs. -2.2) with four of five matched comparisons favoring Core Knowledge schools. When the lowest implementation contrast (Pair E) was eliminated from the group mean, the difference between Core Knowledge and control schools nearly disappeared (.8 for Core schools and -.7 for control schools).

Table 7

Average NCE gains in CTBS *Reading Comprehension* for students moving from *third through fifth* grade

	Pair A	Pair B	Pair C	Pair D	Pair E	Mean School Change	Mean School Change Without Pair E
Core Knowledge	-7.2	3.3	3.2	3.7	-0.8	0.4	0.6
Control	-1.8	0.1	1.7	-2.7	-8.5	-2.2	-0.7

Results from the Maryland School Performance Assessment Program (MSPAP)

In *The Schools We Need & Why We Don't Have Them*, Hirsch (1996) wrote that his "interest in and sympathy for the idea [of performance-based assessments] are of long standing." Hirsch has long advocated for the use of such tests (Hirsch, 1977). In the 1970s and 1980s, he performed research on and conducted experiments with performance-based writing tests. His studies and the work of others led him to revise his opinion about this method of assessment. While Hirsch states that he continues to believe that such tests have some advantages, he writes that "The best uses of performance tests are as lower-stakes 'formative' tests, which help serve the goals of teaching and learning within the context of a single course of study" (1977, p. 263). He no longer believes "that such an approach to large-scale assessment could possibly be accurate, fair, and reasonable in cost" (1977, p. 183).

Hirsch's views apparently are not shared by the Maryland State Department of Education. MSPAP is a high-stakes test. The scores are used as a measure of schools, and by implication, the professionals working in them.

In year three of the study, both of the cohorts being followed were in grades tested by MSPAP (i.e., grades three and five). While the data are presented as "change" data, the change is in school-level scores, not the more clearly relevant change in students over time. Because individual student scores are not available for MSPAP, we are not able to distinguish between students who have been in the Maryland Core Knowledge or control schools from the beginning of the implementation and those students new to the schools. This limitation requires us to assume that non-longitudinal students' parents chose to bring their children to the experimental (Core) and control schools for reasons independent of the ongoing Core Knowledge implementation. Our observations over three years consistently have been that virtually all new-to-the-schools parents did not know that their children's new schools were (or were not) Core Knowledge schools until after they had enrolled. Therefore, we believe that the threat posed to the validity of MSPAP findings is minimal. In this context MSPAP becomes a conservative test of the effects of the Core curriculum. Presumably it would be more difficult to show effects on measures that include students who did not receive the full treatment.

The scores from the 1994 MSPAP administration are used as a pre-Core-implementation measure. In this report, the pre-Core scores are compared with the 1997 (end of third year) test results. As can be seen in Table 8, Column 4, from 1994 to 1997 in third grade the average Maryland school achieved net gains in the percentage of students

scoring at or above the "satisfactory" level on MSPAP. The state-wide school-mean percentages increased in all six MSPAP areas. The range of the three-year increases was from +3.4% in social studies to 15.3% in language usage. Data in Columns 3 and 5 indicate that over the same three years, the five schools that were chosen as best available within-district demographic matches to the Core Knowledge schools posted gains in all six MSPAP areas. In five of six areas, the sizes of the gains were approximately the same as the state gains.[4] In one area, science, the controls substantially outgained the state's average gain (7.6% vs. 3.4%, or a 4.2% difference). In no area did the control schools produce substantially lower MSPAP gains than did the average Maryland school.

Table 8

Mean change from 1994 to 1997 in percentages of third-grade students obtaining scores of "satisfactory" or higher on the six subtests of MSPAP: Five Core Knowledge schools and five control schools versus Maryland state averages

	Change from 1994 to 1997			Change Difference in Schools in Study and All Maryland Schools		
Subtest	5 Core Schools	5 Control Schools	All Maryland Schools	Control Gain Relative to All Maryland	Core Gain Relative to Control	Core Gain Relative to All Maryland
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Reading	+14.8	+9.2	+6.2	+3.0	+5.6	+8.6
Math	+13.4	+8.6	+7.5	+1.1	+4.8	+5.9
Social Studies	+8.6	+3.3	+3.4	-0.1	+5.3	+5.2
Science	+8.5	+7.6	+3.4	+4.2	+.9	+5.1
Writing	+15.3	+7.8	+4.8	+3.0	+7.5	+10.5
Language	+22.7	+13.5	+15.3	-1.8	+9.2	+7.4
6 Subtest Mean	+13.9	+8.3	+6.8	+1.6	+5.6	+7.1
6 Subtest Mean without Pair E	+18.9	+10.5		+3.7	+8.4	+12.1

[4] The evaluation team chose +/-3.0% as a measure of "approximately the same gain." This is a somewhat arbitrary cut-point. For five control schools (approximately 350 students, or 70 third-grade students taking MSPAP per school), a 3% difference in rate of gains would represent an approximate, overall increase of 10 to 13 students achieving (or failing to achieve) "satisfactory" ratings.

Table 8 reveals that, on average, the five Core Knowledge schools also obtained higher gains than did the state in all six areas. The largest differential gains relative to all state schools were in writing (+10.5), reading (+8.6), and language (+7.4). The average Core Knowledge school gains were also higher than the gains made by the control schools.

The last two rows of Table 8 show the average of all of the subtest gains and the average of all subtest gains if Pair E (containing the lowest implementing Core school) were excluded from the analysis. The Core schools show even greater gains. When an average gain is calculated from all subtests, Core schools outperformed the control schools by +5.6 percentages and all Maryland schools by +7.1 percentages. When Pair E is excluded, Core schools gained +8.4 percentages over controls and +12.1 over the average Maryland school.

In summary, while there were substantial third-grade differences among Core Knowledge schools regarding MSPAP gains, the general Core Knowledge trend was one of the gains that clearly exceeded those of the state and of the demographically and geographically matched controls. In a fashion somewhat similar to that seen on the longitudinal CTBS/4 data, when the one minimally implementing experimental school (Pair E) was removed from the analyses, third-grade MSPAP results even more dramatically favored the Core Knowledge schools.

The fifth-grade MSPAP data are shown in Table 9. On average, fifth graders in Maryland schools showed gains from 1994 to 1997 in all six categories of MSPAP. The highest gains were in social studies (+11.0) and language (+11.8). The control schools showed gains in four of the six areas. The only area in which the scores of the control schools dropped was in reading (-3.6 percentages). The five Core Knowledge schools increased scores in all six subtests, with the lowest gain in writing (+3.8) and the highest gain in social studies (+13.7).

The data in Table 9 also show that the control schools did not outgain the average state advances in any subtest. In addition, there was no real differential between the gains of the Core schools and schools statewide. On average, the Core schools outgained the state in three of six categories but lagged behind in the remaining three. Core schools did, however, outgain their controls by +7.1 percentages.

When the gains made on all six subtests are averaged, the control schools lost ground relative to the mean state gain since 1994 by -6.5 percentages. The Core schools neither

gained nor lost. However, when the scores of the marginally implementing Pair E are excluded from analysis, the control schools' loss is reduced to -5.4 percentages and the reasonably well-implementing Core schools produced a mean gain of +9.5 percentages.

In summary, fifth-grade MSPAP data reveal some similarities and some differences with third-grade data. As was the case on third-grade MSPAP, Core Knowledge schools produced greater MSPAP gains than matched control schools in most areas. However, in contrast to third grade (where both controls and experimental schools almost universally outperformed the state average gains), the control schools' fifth-grade gains were actually below the state average. The net effect was that Core Knowledge schools produced approximately the same fifth-grade MSPAP gains as did the average Maryland school. As was the case with grade-three analyses, dropping the minimally implementing Core Knowledge school from the analysis resulted in increased three-year gains for the Core Knowledge schools. As was the case with studies of other reforms (e.g., Crandall et al., 1982; Stringfield et al., 1997), quality of reform implementation was very important.

Table 9

Mean change from 1994 to 1997 in percentages of fifth-grade students obtaining scores of "satisfactory" or higher on the six subtests of MSPAP: Five Core Knowledge schools and five control schools versus Maryland state averages

	Change from 1994 to 1997			Change Difference in Schools in Study And All Maryland Schools		
Subtest	5 Core Schools	5 Control Schools	All Maryland Schools	Control Gain Relative to All Maryland	Core Gain Relative to Control	Core Gain Relative to All Maryland
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 6
Reading	+4.2	-3.6	+5.4	-9.0	+7.8	-1.2
Math	+9.9	0.0	+6.1	-6.1	+9.9	+3.8
Social Studies	+13.7	+1.0	+11.0	-10.0	+12.7	+2.7
Science	+8.9	+4.6	+7.6	-3.0	+4.3	+1.3
Writing	+3.8	+5.2	+6.1	-0.9	-1.4	-2.3
Language	+7.6	+1.9	+11.8	-9.9	+9.5	-4.2
6 Subtest Mean	+8.0	+1.5	+8.0	-6.5	+7.1	0.0
6 Subtest Mean without Pair E	+12.1	+2.6		-5.4	+9.5	+4.1

Summary

This report summarizes three years of data on implementation and effects of the Core Knowledge curriculum in five Maryland schools. Third-year data indicate that nearly full implementation is possible. Level of implementation of specific content has varied by school and by school-site-level availability of content-specific resources. In general, the presence of an actively involved-in-implementation leader has been critical to implementation. The presence and weight of the Maryland School Performance Assessment Program, which is not well aligned with Core Knowledge, has affected implementation in all schools. Some schools have used Core as one vehicle to teach MSPAP-like skills, others have not.

A Core Knowledge advocate might argue that an increase in the scores on CTBS/4 and MSPAP would be irrelevant. They might contend that if a student clearly learns information in school that is beyond what is traditionally taught, and that student's scores do not drop as a result of participation in Core, then Core participation has exhibited worth at no cost on the locally valued measures. (Such an argument would focus attention on the *value* of the Core Knowledge content itself, a focus that the Core Knowledge Foundation would probably find laudable.)

Overall longitudinal gains as measured on the Comprehensive Test of Basic Skills have been uneven. Particularly in the first-through-third-grade cohort, gains have tended to vary with level of Core Knowledge implementation, with more highly implementing sites tending to obtain more positive results. In general, CTBS/4 gains were greater in Core Knowledge schools in the area of reading comprehension, an area most plausibly linked to Core, than in mathematics, in which schools reported no Core-specific changes.

Changes in scores from 1994 through 1997 on the third-grade MSPAP strongly favor the five Core Knowledge schools over both controls and the state average. As was the case with CTBS/4, the removal of the one minimal-implementation site (and matched control) from the analyses made the relative gains even greater.

Core Knowledge schools' fifth-grade MSPAP gains from 1994 through 1997 were greater than those of matched controls, but not substantially different from state average gains. Removing the one minimal-implementation site from the analyses moderately improved the fifth-grade trends.

The Core Knowledge schools' more uniform gains in the first-through-third-grade cohort would appear to be consistent with Hirsh's (1987, 1996) thesis that knowledge must build coherently over time. The younger cohort had experienced Core Knowledge curricula

since first grade and in Hirsh's model would be expected to achieve the benefits of cumulative gains.

In the five-school Maryland study, implementation of Core Knowledge was clearly demonstrated to be possible. More nearly full implementation was associated with the availability and use of common planning time, the care taken to induct new teachers into the Core curriculum, success in negotiating any Core/local curriculum conflicts, finding ways to use Core Knowledge that were supportive of the state's student testing program, sustaining Core as a priority in the face of competing educational reforms, and continuing to acquire adequate resources after each school's two-year implementation grant expired.

In only one outcome analysis (first-through-third-grade CTBS/4 reading gains) did the majority of Core Knowledge schools fail to meet or exceed control and/or Maryland state average gains. In third-through-fifth-grade CTBS/4 reading comprehension and in both third and fifth-grade MSPAP analyses, the majority of analyses favored the Core Knowledge schools. When the lowest implementing school (and control) were dropped from the outcomes analyses, results in all areas favored the Core Knowledge program, and the size of the differential effects increased.

These results indicate that use of the Core Knowledge curriculum can have positive effects on student achievement. Given that more positive outcomes were associated with moderate to high levels of implementation, the analyses also indicate that Core Knowledge is most viable in schools and districts that are likely to be supportive of strong implementation.

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TECHNICAL APPENDICES

Data from the

Core Knowledge Teacher Survey

The Technical Appendices provide detailed information about (1) a teacher survey which was sent to each classroom teacher in grades one through five and each art and music teacher in the five schools in the Maryland study and (2) the results of the Mathematics Concepts and Applications subtest of the CTBS/4.

The Technical Appendices are available only in the printed/hard copy version of this report. Appendices Table of Contents follows this page.

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