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ABSTRACT

This report, first of a biennial series, establishes national priorities for education research. The priorities reflect the ideas and concerns of students, parents, educators, community members, policymakers, and researchers. The seven national priorities that are defined are: (1) improving learning and development in early childhood; (2) improving curriculum, instruction, assessment, and student learning at all levels of education; (3) ensuring effective teaching by expanding the supply of potential teachers, improving teacher preparation, and promoting career-long professional development at all levels of education; (4) strengthening schools; (5) supporting schools to prepare diverse populations to meet high standards; (6) promoting learning in informal and formal settings; and (7) understanding the changing requirements for adult competence. Within each of these priorities, it will be essential to ensure equity and reflect diversity, stress the importance of the family, and fulfill the promise of educational technology. These priorities proceed from the belief that public schools should become more public in spirit and in practice. (Contains 114 references.) (SLD)

Building Knowledge for a Nation of Learners

A Framework for Education Research 1997

Department of Education
of Educational Research and Improvement

Building Knowledge for a Nation of Learners

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A Report by the Assistant Secretary, Office of Educational Research and Improvement, Sharon P. Robinson, and the National Educational Research Policy and Priorities Board.

U.S. Department of Education

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An Open Letter to the American People

We are pleased to present this first biennial report, which establishes national priorities for education research. These priorities are based on the recognition that the nation is strengthened by a population that values and pursues a lifetime of learning, and that a critical prerequisite for meeting this goal is an investment in education research to improve the achievement of all learners. The priorities reflect the concerns and ideas expressed by people like you: the many students, parents, educators, community members, policymakers, and researchers we consulted along the way.

Together, these priorities are a framework for knowledge that will support better teaching and improved student learning in and beyond America's schools and classrooms. The priorities are intended both as a basis for federal investment in education research and as a starting point for a larger national conversation. As part of that conversation, the Office of Educational Research and Improvement and the National Educational Research Policy and Priorities Board will sponsor occasions where scholars and consumers will be invited to give greater focus to the questions that will help shape investments for future research.

In that spirit, we invite you to read this report with a close and critical eye and to join our efforts to sharpen the definition of our work.

Sharon P. Robinson
Assistant Secretary
Office of Educational Research and Improvement

Kenji Hakuta
Co-Chair
National Educational Research Policy and Priorities Board

Ted Sanders
Co-Chair
National Educational Research Policy and Priorities Board

National Priorities for Research in Education

- Improving learning and development in early childhood so that all children can enter kindergarten prepared to learn and succeed in elementary and secondary schools.

- Improving curriculum, instruction, assessment, and student learning at all levels of education to promote high academic achievement, problem-solving abilities, creativity, and the motivation for further learning.

- Ensuring effective teaching by expanding the supply of potential teachers, improving teacher preparation, and promoting career-long professional development at all levels of education.

- Strengthening schools, particularly middle and high schools, as institutions capable of engaging young people as active and responsible learners.

- Supporting schools to effectively prepare diverse populations to meet high standards for knowledge, skills, and productivity, and to participate fully in American economic, cultural, social, and civic life.

- Promoting learning in informal and formal settings, and building the connections that cause out-of-school experiences to contribute to in-school achievement.

- Understanding the changing requirements for adult competence in civic, work, and social contexts and how these requirements affect learning and the futures of individuals in the nation.

Contents

What Do We Need To Know?

We Americans pin our fondest hopes on education. As a noted philosopher once observed, education in this country plays a "different and, politically, incomparably more important role than in other countries" because it mirrors a challenge that is so deeply embedded in the American experience—creating a new nation.[1] Americans have long been bent on solving all kinds of problems—social, political, and economic—by educational means. Decade after decade, we have staged our most momentous national dramas in schoolyards and classrooms.[2] When the Soviets launched Sputnik, Americans reacted by demanding better schools. Congress responded by passing landmark education legislation. When the civil rights movement challenged the status quo, public schools and universities became the setting for fierce tests of national will.

Today, rapid political and technological change around the world has created another crisis of confidence and another moment of opportunity. Will Americans be ready to meet the demands of a new era? Will our young people be equipped for economic survival and growth in the 21st century? Can we strengthen the bonds among people from different racial, ethnic, cultural, and socioeconomic groups and sustain the nation's democratic institutions? Responding to these challenges, Americans have once again hoisted education reform to the top of national and local agendas.

Opinion differs on the emphases and methods of schooling and on the best use of the nation's resources. Some observers of education want greater investment in mathematics and science, while others stress the need to bolster arts education. Some want more weight placed on values and character formation; others believe that schools should adhere to a more narrowly conceived educational mission. But large numbers of Americans—parents, teachers, employers, scholars—are moving toward

I started my career as a scientist and grew to become a teacher. It was natural for me to use research to develop my teaching. One thing I have learned from research—and confirmed in my own classroom—is that when teachers buy into what they are teaching, students catch their enthusiasm. . . . My students know that I work for them, and that each and every one is important and has talents and abilities that can make our future better.

Bill Martin
Eighth-Grade
Science Teacher
Fort Payne Middle School
Fort Payne, Alabama

consensus on at least one point: in order to meet new challenges in the workplace and in civic life, America's learners will need a firm grasp of basic competencies, a broad general knowledge of their world, and the skills to respond to the rapid generation of new knowledge. Every recent report on education calls upon schools to help students become not only knowledgeable adults, but also reflective analysts, independent problem solvers, and effective team players.

One thing is clear: if the nation's schools and colleges are to meet these challenges, we cannot afford hit or miss approaches driven by fads and fallacies. We need solid scientific evidence about what works, for whom, and under what conditions.

We are poised at a unique moment in the history of educational research and development. The level of public interest in improving America's schools is unprecedented, a solid body of education research now exists upon which to build new knowledge, and evidence is mounting that past research has already led to important advances in education practice. Moreover, the Office of Educational Research and Improvement (OERI) has a clear mandate to lead the effort to provide a focus for educational research and development across the nation.[3] This mandate was issued by the 103rd Congress when, in 1994, it charged the Assistant Secretary for Educational Research and Improvement and the National Educational Research Policy and Priorities Board (the Board) to develop a biennial plan to set forth national education research priorities.[4]

The national education research priorities that follow are the first response to Congress' request. To be sure, the idea of setting a research and development agenda is not new: OERI has taken part in numerous cooperative efforts to define and augment the role of research and development in American education. But this is the first attempt to develop a comprehensive vision of the nation's needs for knowledge

about education, and to set clear priorities for education research geared to meeting those needs.

This document sets forth seven national priorities for research in education developed by the Assistant Secretary and the Board:

- **Improving learning and development in early childhood** so that all children can enter kindergarten prepared to learn and succeed in elementary and secondary schools.
- **Improving curriculum, instruction, assessment, and student learning** at all levels of education to promote high academic achievement, problem-solving abilities, creativity, and the motivation for further learning.
- **Ensuring effective teaching** by expanding the supply of potential teachers, improving teacher preparation, and promoting career-long professional development at all levels of education.
- **Strengthening schools**, particularly middle and high schools, as institutions capable of engaging young people as active and responsible learners.
- **Supporting schools to effectively prepare diverse populations** to meet high standards for knowledge, skills, and productivity, and to participate fully in American economic, cultural, social, and civic life.
- **Promoting learning in informal and formal settings**, and building the connections that cause out-of-school experiences to contribute to in-school achievement.
- **Understanding the changing requirements for adult competence** in civic, work, and social contexts and how these requirements affect learning and the futures of individuals in the nation.

In establishing these priorities, the Assistant Secretary and the National Educational Research Policy and Priorities Board set out to do more than create an agenda for a federal agency. The priorities they have identified constitute a program of research that can inspire the work of education researchers throughout the nation. The results of their work can guide the efforts of people in all parts of the nation's educational enterprise as they work to improve America's schools. These priorities suggest directions for future education research and investment by pointing to crossroads where the greatest public concern intersects with important scientific opportunity.

The leadership role of the Assistant Secretary and the Board in establishing priorities and putting them to work entails much more than presenting them in this report. With this publication, the Assistant Secretary and the Board are initiating a national conversation about the importance of these priorities and the roles that interested groups and individuals can play. Progress toward implementing the priorities will be reviewed every 2 years, and adjustments will be made. Over time, the priorities may change as substantial progress is made in some areas and pressing needs arise in others.

These priorities grew out of a nearly 3-year process of deliberation and consultation. The deliberations that led to these seven priorities included 45 public discussions with more than 500 people representing 30 groups. The participants included parents, teachers, business people, students, and researchers inside and outside the nation's formal education enterprise. The Assistant Secretary and the Board asked each group what new knowledge was needed to improve education over the next 5, 10, and 15 years.

The Assistant Secretary and the Board sought to create a stronger research and development capacity by building on existing knowledge and making continual improvement part of the culture of every public school and institution of higher learning. Therefore, clear criteria guided the selection of

priorities from the diverse and often competing ideas that arose from the public discussions. Each priority reflects an authentic and important educational need, the solution of which would be of national significance. Each priority addresses critical problems, affects large numbers of students, or involves major investments in education. And in addressing each priority, research is likely to result in substantial new knowledge that has the potential to significantly improve the education of our children.

Finally, three important issues emerged that need to be addressed within each priority:

The Need To Ensure Equity and Reflect Diversity

The nation especially needs research that can lead to better results for those who have tended to achieve at lower levels. In particular, research needs to take into account the impact of poverty on learners and their schools. Studies have repeatedly established that students from low-income families must, from their earliest years, scale greater hurdles than others to secure educational services, to achieve academically, and to succeed in the labor force. Recent research confirms that poverty has an impact on curricula, the ways technology is introduced into instruction, the ways schools are organized, the resources available to teachers, access to extracurricular programs and after-school jobs, safety in school, and many other factors.[5] To be useful, therefore, research must lead to educational improvement strategies that take into account differences among students, their schools, and their communities.

The Importance of the Family

Parents and families are their children's first and most important teachers. We need research that can help us understand how to build better connections between home and school. We need to know more about why some families and children succeed in settings where most do not. We need to understand how parents can best encourage and support learning. We need research that can lead to more effective cooperation among families, communities, and schools to strengthen learning and teaching. And we need insight into the ways that family support programs can strengthen families' capacities to cope and even thrive during periods of stress.

The Promise of Educational Technologies

Emerging technologies have the potential to support and motivate learning, creativity, and problem-solving. Inventively infused into active learning, they can open up the world for learners of all ages, in every setting; but when new technologies are bolted onto uninspiring curricula or mind-numbing drill, they can deaden educational experience. We need research that points toward ways to increase learners' access to educational technologies and to narrow the divide between technology "haves" and "have-nots." We also need to reconsider many facets of educational practice across all of the priorities with a view toward enhancing the potential and minimizing the risks of educational technologies.

In the document that follows, chapter 1, "Research for a Changing World," discusses the needs of American learners as we approach the 21st century and proposes an approach to educational research geared to meeting those needs. Chapter 2, "An Agenda for the Nation," shows how this approach can be applied to each of the seven national education research priorities. Chapter 3, "Putting the Priorities to Work," suggests how people in many walks of

life, not only teachers and parents, can play a role in formulating, advancing, and benefiting from the nation's education research agenda.

The national education research priorities reflect the commitment of the U.S. Department of Education and the Board to inform, enrich, and strengthen all of America's educational institutions and to benefit all of America's learners. The priorities express particular confidence in and hope for the enterprise of public education. We often hear today that public schools should become more like something else: more like private enterprise, more like schools in other countries, more like private or parochial schools. These priorities proceed from the belief that public schools should become, in spirit and in practice, more public. They need to be more inclusive in their improvement efforts; more committed to meeting the needs of learners, their families, and communities; and more responsive to the evolving priorities and concerns of the nation as we move into a new century. Our nation has the capacity to mount the educational research efforts called for by these priorities—efforts that meet rigorous scientific standards and produce findings that are bold, useful, and responsive to important questions of the day.

Chapter 1

Research for a Changing World

How does a society that wants to ensure its future survival and well-being educate its people? If we could accurately forecast the full range of issues our learners will confront in coming decades, if we could confidently predict the problems they will have to solve and the opportunities they will want to seize, we might be able to prescribe courses of study that would cover everything they will need to know in the 21st century.

But predictions about the future are notoriously perilous. Fifty years ago, some predicted that by the year 2000, Americans would be flying from place to place sporting personal jet packs. But they didn't foresee that fax machines and the Internet would make worldwide commerce and personal communication possible without leaving home. Fifty years ago, experts also predicted that the worldwide market for computers would be no more than a grand total of 10. They failed to predict that instead of getting bigger and bigger, computers would become smaller and smaller, not to mention cheaper and cheaper. They did not foresee the rapid spread of personal computers into schools and workplaces. They did not anticipate how dramatically computer-based technologies would transform our work lives—how we define our work, how we get it done, and how we interact with each other in the process.[1]

Clearly, even our most flamboyant forecasts cannot contain the realities that our children and grandchildren will meet. Rather than tailoring schooling to our projections of what they will need, we must give them a firm grasp of basic skills and in-depth content-knowledge, and also the capacity to understand, analyze, and transform the conditions they will encounter. When we ask whether today's learners will be prepared to succeed in tomorrow's workplace, we have to take into account that tomorrow's workplace may not be a "place" at all, but rather an arena through which information will circulate, information to which workers will be expected to apply analytic effort.[2]

Where do today's students stand in relation to these challenges? Many Americans believe that, compared with the schools they attended when they were young, the nation's schools are in decline.[3] The data show that on the whole, however, today's students are achieving about as well as students did a quarter century ago.[4] This is no small achievement, considering that today's schools face higher hurdles than did schools of the past. The populations historically least successful in school—low-income children and racial or linguistic minorities—now constitute much larger numbers of school children than ever before, and this trend is expected to intensify in coming years.[5] Recent immigrants with limited English proficiency are entering our schools in record numbers. And while poverty levels for the nation as a whole have not changed significantly since the 1970s, the percentage of children in poverty has grown, corresponding with declining economic prospects for young, poorly educated male workers, and the sharp increase in single-parent households.[6]

Under these circumstances, the National Assessment of Educational Progress (NAEP) shows that in most areas today's students are achieving at about the same levels as students tested in 1971. Moreover, students at all three age levels studied by the NAEP (ages 9, 13, and 17) appear to be learning more in mathematics and science, judging by modest increases in scores between 1982 and 1992. In contrast, reading and writing performance have stayed about the same.[7]

The bottom line is that nationwide, educational performance is holding steady in many areas of the curriculum and marginally improving in others. But considering the challenges that lie ahead, that is not nearly good enough. By the time they finish high school, most American students cannot complete writing samples that contain sufficient information to sustain an argument, and most students still grapple with challenging reading matter. The vast majority of high school seniors cannot synthesize and learn from specialized reading materials, nor can they solve multistep

problems.[8] In short, they lack precisely the skills that will be most highly valued and most highly rewarded in coming decades.

Where do we go from here? We begin by acknowledging the hard work and achievement too often obscured by a deluge of disappointing data. The fact that American schools have held the line academically over a quarter century despite very tough challenges reflects the dedication and determination of millions of teachers and parents and the efforts of millions of students across the nation. But we need research that contributes to new ideas and processes and leads to better solutions for America's learners in the coming century.

What kinds of investigation will meet the criteria of the scientific community, while moving the nation toward the goal of helping learners master basic skills, grasp in-depth content, and acquire the analytic and interpretive abilities they will need to succeed in the next century? During the deliberations that led up to the formulation of the national education research priorities, parents, researchers, and policy makers told us repeatedly that:

We Need High Quality Research With Results We Can Count On

Research has no value if the results cannot be trusted. Research that can be counted on must meet the basic tests of science. It must reflect competent research design and methodology, including accepted standards of data collection and analysis. Research hypotheses and questions should be linked to sound theory and should acknowledge contributing and competing theories.

The American education research enterprise also needs to seek strategic opportunities to support work that addresses difficult methodological issues and controversies and that advances the state of the art in research design. It also is

New Strands of Research

What works and why? What accounts for the properties of power and resilience? How can a process be duplicated or extended? In virtually every field of human endeavor, researchers ask questions like these. To answer them, researchers have to confront the immense complexity of what makes a particular substance or strategy, problem or program unique.

Case in point: spider silk. Researchers around the world, including American scientists at the Natick Research, Development and Engineering Center of the Army in Massachusetts, have been studying this remarkable material and have found that the delicate threads that make up a spider web are actually stronger than steel and more durable than nylon. Imagine the marvelous materials scientists could produce by analyzing and duplicating spiders' lightweight, water-resistant, super-tough webs.

For years, researchers have known the ingredients and composition of the fluid that spiders squirt through the hole in their backs. But to use this knowledge—to translate insights about spider silk into new, space-age materials—they need to know much more. What is it about the silk's molecular architecture that accounts for its toughness? What happens to that structure when the fluid is expelled into the open air and begins to dry? What stages does it go through in its evolution from a water-based fluid into a stable web of astonishing strength? What is the impact of temperature? What about pressure? As one scientist has commented, "We are still in a fundamental stage of research."

Constrained by limited resources and an impatient public, education researchers have too often cut short this kind of inquiry. When a strategy or program boosts achievement, education researchers identify its basic ingredients and then attempt to reproduce it. But they sometimes are not given the time to develop a full understanding of which strands in the intricate web connect the specific program components with the particular learners, to explain its strength and durability. What is it about the way this effort was structured that accounts for its effectiveness? How has that structure evolved? How do the links among its many parts affect results? And how do crucial environmental factors impinge on its success or failure?

Like the silk scientists, educators are still in a fundamental stage of research. We know a great deal, but many of the most significant discoveries about learning and teaching lie ahead. As we edge toward a new century, teachers and other educational researchers need to pursue approaches that ask important questions, allow for sustained, responsible inquiry, recognize and accommodate complexity, and produce the kinds of knowledge that can improve results for all of our nation's learners.

See Sources for Sidebars and Data Boxes.

important that the research community accept multiple conceptions of social science and be willing to test nonconventional methodologies.

We Need Research That Takes into Account the Real World Conditions in Which Teaching and Learning Take Place

Today's learners are expected not only to acquire information but to use it to make sense of their world. They are encouraged to relate facts and concepts they learn in school to issues and challenges they face in their families and communities. We can expect no less of the research that informs their education. Research that looks at education in a vacuum, without considering the problems and issues that saturate the communities in which it takes place, cannot lead to effective improvement strategies. We need research rooted in the realities of learners' everyday experience and the flow of classroom life. Education research is most powerful when it gives all of us tools to help us learn from our experiences in ways that make us better learners and teachers.

We Need To Bridge the Gap Between Research and Practice

Too often, researchers' insights are hermetically sealed in campuses and conferences and fail to reach classrooms. Teachers frequently report that they do not use research and do not see its connection to what they do day by day in their classrooms.[9] We need a more collaborative framework for research, linking schools with universities and other institutions and anchoring research in classroom practice. Teachers must be participants in educational research and development from their first education courses, through their professional development, and on to their service as mentors to new teachers.[10] We need research that helps the institutions and the people who work in them raise

I am a strong believer in classroom-based research. I became convinced when a colleague and I developed a 12th-grade course that integrated mathematics and physics instruction. Data that we gathered over a period of four years demonstrated that the course significantly improved student performance and increased the demand for math and physics in our school. Our efforts helped gain community acceptance for interdisciplinary efforts in other subject areas, and the whole experience helped me become a better teacher.

Jacqueline Omland
High School Physics Teacher
Aberdeen, South Dakota

questions about their own goals and practice as part of their everyday work. We need research that convinces people to abandon practices that do not improve student achievement.

We Need Research That Treats Learning as a Lifelong Endeavor, and Reinforces Links Among Different Levels of Education

Learning is continuous; formal education is not. Responsibility for formal education is divided, for reasons both practical and historical, among a wide range of institutions aimed at particular age spans. For older learners, responsibility is divided according to the credential that is being sought. The assumptions and expectations learners meet at each level and in each institution vary dramatically. Learners are exposed to different instructional practices and different ways of gauging their progress. Because research traditionally focuses on particular institutions, rather than the connections (or disconnections) among them, we need to know more about how learners can be helped to make successful transitions.

Research by itself does not always provide startling or transforming revelations. But research plays an absolutely crucial role in helping us understand our own educational experience in new ways so that all of us—teachers and parents, administrators and academics, policy makers, and concerned community members—can make the best possible decisions for our children, our communities, and our nation. To research is, after all, to take another look—to re-examine, through a different optic, the phenomena of learning and teaching. The best educational research helps us vault beyond practices or conditions that strike us as natural, necessary, and expected. Given different templates, we can see other patterns. Given different approaches, we can come up with different questions and better answers.

In summary, research is needed that meets the highest standards of scientific inquiry, but also is rooted in the everyday experience of students and teachers and the reality of schools. Research efforts can engage all of the people—academics and nonacademic alike—who are concerned about strengthening education in all of the settings where learning takes place.

Chapter 2

An Agenda for the Nation: Establishing Priorities for Education Research

Together, the seven educational research priorities discussed in this chapter form the core of an education research agenda for the nation. They deal with many facets of American education inside and outside formal institutions. They address all levels of schooling: from infant and toddler programs through higher education and on-the-job training. The priorities are a framework for building knowledge to support and inform the efforts of Americans to improve learning and teaching.

These priorities not only will provide a keener focus for new research, they also will provide a framework for the development of new practical applications of research and guide dissemination efforts. In addition, the array of questions that will be refined and addressed under each of the priorities will be selected to create a balanced research agenda. Some questions will address urgent needs of teachers and administrators in schools and classrooms, others will seek to illuminate difficult, long-term policy questions, and still others will contribute to a foundation of scientifically tested knowledge and rich theory on which to ground future research and development.

In setting this agenda, the Assistant Secretary and the Board refrained from ranking the priorities. None of these priorities can stand alone. Research efforts that view the learner in isolation, or a school in isolation, cannot fully succeed. The priorities arise from the conviction that the ultimate aim of educational research is to improve each American's capacity to participate in the nation's cultural, economic, social, and political systems. Efforts to strengthen learning and teaching cannot be conceptualized or implemented apart from these systems.

We are all better off when we turn to knowledge to solve problems. Research on these priorities can contribute to a culture of knowledge-based reform, where knowledge plays an important role in efforts at school improvement.

Kenji Hakuta
Co-Chair
OERI National Educational Research Policy and Priorities Board

- Of the more than 10 million working mothers in the United States, 62 percent have children under the age of 6.
- More than half of all mothers return to work within a year of their babies' births.
- Approximately 13 million children attend early care and education programs each day—either in center-based programs or family care homes. More than half a million preschoolers receive special education services.
- Over the last three decades, the percentage of 3- and 4-year-olds enrolled in nursery schools rose from about 11 percent to 48 percent.
- The great majority of 5-year-old preschoolers can identify primary colors (89 percent), write or draw rather than scribble (84 percent), count to 20 (78 percent), and either read or tell connected stories while pretending to read (79 percent).

See Sources for Sidebars and Data Boxes.

Early Childhood Learning

Priority: Improving learning and development in early childhood so that all children can enter kindergarten prepared to learn and succeed in elementary and secondary schools.

The storefront on State Street is decorated for the season: snowflakes cut from doilies and snowmen covered with wads of cotton. Through the snowflakes passersby catch glimpses of the small children inside as they wander about the room, picking up toys, trying on a fire chief hat, or watching a turtle rest under a plastic umbrella. This is the Beanstalk Child Care Center, and dozens of parents rely on its staff to care for their preschoolers for up to 50 hours each week. But are these children getting the care and education they need? Are they learning all that they should? Many of the parents say that they're going on faith, and that in any case they can't afford most of the other programs in town. And after all, they say, young children just play wherever they are. . . .

But in fact, very young children are biologically primed for learning.[1] Parents and early childhood educators have always been awed by the astonishing rapidity with which children in the preschool years grasp new skills and concepts. This potential for rapid learning argues for careful attention to the young child's earliest learning experiences. However, there is mounting evidence from numerous lines of inquiry within several disciplines that formal education that begins only at age five—the traditional age of entry into public schools—is too late and has limited payoff for children's learning.[2]

Qualitative Research and Early Care and Education

Research in early childhood education has tended to focus on the kinds of questions that can be answered with numbers and graphs: how many children have been served? for how long? for how much? and with what effect? By documenting broad trends these studies help to inform policy and guide practice. By riveting attention on results, they are helping to shape and gain acceptance for new and better definitions of quality in early care and education. But more and more researchers are concluding that quantitative studies should not stand alone, and that "qualitative" research, such as case studies, can add substance and subtlety to the field's knowledge base, enriching our understanding of early learning and of the kinds of settings and interventions that promote healthy development.

Qualitative educational research seeks to understand events, behaviors, and relationships and the effect they have on the ordinary conduct of people's day-to-day lives. Qualitative research on early childhood education looks at children's experience as it is lived, attempting to see the world from the child's point of view. For example, it can analyze classroom "discourse," the rules of conversation that shape interactions between caregivers and children. It seeks to understand the systems of meaning that prevail in classrooms, playgrounds, family day care, and other community settings.

Qualitative studies of early childhood education have closely examined such commonplace events as a teacher reading a storybook to a group of children, or a toddler throwing a tantrum at a day care center. They have looked at the experiences of the adults in children's lives, studying for example the relationships between mothers and family day care providers. The premise of such studies is that children learn in the context of relationships; the goal is to understand the specific kinds of ties and interactions that promote or inhibit learning for specific groups of children in specific settings.

Qualitative studies can yield what anthropologist Clifford Geertz has called "thick descriptions" of classrooms, child care centers, family care settings, and communities. They can be fascinating to read, and are often more meaningful to practitioners than statistical studies that compare data gathered from many programs. But are they asking the right questions? What yardsticks can we use to measure or judge their findings?

Qualitative studies don't lend themselves easily to traditional ways of measuring the validity, generalizability, or replicability of research. Some efforts have been made to adapt traditional norms of research and standards of evidence to fit qualitative work, but considerable work remains to be done in this area.

Qualitative research has received short shrift in many fields of education, but perhaps especially in early childhood, due to the mistaken belief that the younger children are, the less we need to know about how, what, and why they learn. This is changing, however, as researchers recognize that many crucial questions have yet to be answered—or asked. As one article recently noted: "As researchers, we have measured people, but we have not listened well to them."

See Sources for Sidebars and Data Boxes.

Over the last three decades, many studies have shown that a high quality preschool experience boosts later achievement and social adjustment, reduces the likelihood of retention or placement in special education, and increases the chances of graduation from high school.[3] Research over time shows that the negative effects of poverty can be reduced by participation in high quality early programs.[4]

We need to pull practitioners at all levels of education into the process of research because practice improves through reflective activity in which people analyze and think through what they are doing.

Don Phillips
Superintendent
Mountain View-Los Altos Union High School District
California

Additional, dramatic evidence of the vital importance of early education recently has come from the field of neuroscience. Thanks in part to the development of sophisticated brain scan technology, neuroscientists are providing new insight into the opportunities and risks of the early years. For example, we now know that experience has a direct influence on the connective pathways that are established in the brain during the early years. We also know that if some pathways are not formed during the first few years of life, learning new things later in life can be more difficult.[5] In this way, the quality of children's early experiences not only affects their comfort and sense of security, it actually affects their brain development and their later ability to learn and reason.

In light of these new insights, the benefits of high quality early care and education become even more compelling. The key word is *quality* and therein lies the problem. Approximately 13 million young children attend early care or family care homes.[6] Despite the importance of the preschool years,[7] recent research shows that of every ten center-based programs, seven provide mediocre care, and one is so inadequate that it jeopardizes the children's health and safety.[8] Another recent quality study focused on family child care homes, and found that half of unregulated homes are of substandard quality.[9]

While all young children need high quality early care, an especially important area for research is early childhood special education. Today, preschoolers represent the fastest growing segment of the special education population, based on a greater commitment to early intervention.[10] In 1992,

more than half a million children from birth to age five were receiving special education services.[11] Programs these children receive vary greatly. Recent years have witnessed efforts to bring coherence to the field by infusing a family-centered approach into virtually every aspect of early childhood special education, and promoting a more integrated approach to early intervention. More attention is also being paid to professional certification for early childhood special educators.[12] Further research is needed to gauge the efficacy of these approaches, and to identify other strategies for meeting the needs and building on the strengths of an increasingly diverse population.

On the basis of these and other findings, the Assistant Secretary and the National Educational Research Policy and Priorities Board have included improving early childhood learning and development on the nation's educational research agenda. They have done so, mindful of the fact that if the nation misses the opportunities that present themselves in children's early years, later investments cannot yield the results Americans want for their older children. In other words, research that overlooks the learning and teaching that occur before the age of five cannot provide an adequate roadmap for education reform. We know that by the end of third grade, when most children are eight, they tend to be locked into achievement trajectories that determine their future academic success.[13] It simply makes no sense to ignore 5 of those precious 8 years.

To build on what we know, we need to address such questions as:

How do children develop and learn?

How can we build on recent findings about how children think and communicate? How can we use insights into young children's relationships with the adults in their lives to strengthen learning? How can we translate new findings about the young child's use of symbolic tools to strengthen literacy?

What are the most effective methods for teaching young children?

How can we infuse more challenging, engaging content into early childhood experiences? What are the best uses of technologies to teach young children? What can we learn from successful initiatives in other countries? How can we best serve young children whose primary language is not English?

How can we create stimulating learning environments for all children?

What constitutes quality in early care and education? How can quality care be equitable for all of our youngest learners? How can we define quality to apply to children and their families? How can we attract and keep well-qualified teachers and support staff in pre-schools and day care? How can we create a coherent system of policies that supports improved early childhood programs?

How can families and communities do a better job of supporting young children's learning?

What kinds of collaboration between families and communities can best support children's learning and development? What parenting strategies appear to be most effective?

What are the most effective and efficient uses of community resources and social services for early childhood learning and development?

How can we better integrate services for young children with disabilities? How can community organizations assist with the transitions that children make between different settings—within a day and over the course of years?

- Approximately 52 million students are enrolled in elementary and secondary schools nationwide. Of these students, 89 percent attend public school.
- The average number of credits earned by graduating high school seniors between 1982 and 1992, increased by more than 2. The percentage of graduates who earned at least 4 English credits, 3 social science credits, 3 science credits, and 3 math credits increased from 13 to 47 percent.
- In 1995, 87 percent of all 25- to 29-year-olds had a high school diploma or equivalency certificate, up from 78 percent in 1971.
- About 1 of every 16 elementary and secondary students is enrolled in a program for the gifted and talented.
- Computers are used in schools by 59 percent of all students.

See Sources for Sidebars and Data Boxes.

Student Learning

Priority: Improving curriculum, instruction, assessment, and student learning at all levels of education to promote high academic achievement, problem-solving abilities, creativity, and the motivation for further learning.

On their way to school, the children pass a crevice in the street where the jackhammers have broken through; a half-dead elm that came down in last night's storm; a new video game that has just appeared in the laundromat. They hear Mrs. Ulanov, lunchbox in hand, calling after her son Dmitry with a rush of words that all sound like "hush" and "shush." Seven televisions in the window of Acme Appliances show seven silent, wildly expressive singers. The children get to school, stuff their jackets in their lockers, and copy the "Do Now" from the blackboard.

As Marshall McLuhan commented, a child today knows that sometimes "in going to school he is in a sense interrupting his education."[14] But teachers, and the people and institutions responsible for their training, are now making a concerted effort to educate children by tying instruction more closely to real world experience. Enriching education with challenging curricula and strengthened instruction means making the world come alive in the classroom. It means engaging learners in the process of making sense of the systems that give shape and order to that world. It means helping them discover their own place in it, their own ability to act upon it, their own capacity to make a difference in it. Given the performance, scope, and size of American education, this is an enormous challenge.

In 1996, nearly 52 million children enrolled in the nation's elementary and secondary schools—a record for American education. Over the next decade, enrollment will increase by another 3 million students. Public high school enrollment

My students come to school from a variety of different and sometimes difficult family and neighborhood circumstances, and I need to be able to engage all of them in every aspect of learning—from technology-aided research to journal writing. I need access to good research in a forum where I can examine my instructional methods and answer the question: What is it that good urban teachers do to make their students more successful?

Linda C. Wharton
Maryland Writing Project

will increase by 15 percent; college enrollment will rise by 14 percent. Just to maintain the current level of class and school size in grades K–12, the nation will need 190,000 additional teachers and more than 6,000 additional schools.[15]

By the year 2006, the nation will spend $321 billion per year on K–12 education.[16] What does the nation get for its investment? Recent reports repeat a well-known story. The most rigorous international comparison of education ever conducted shows that in mathematics, our eighth-graders on average score below their peers in 41 countries. In science, they score below the eighth-graders in such countries as Hungary, Korea, Japan, the Czech Republic, and Singapore.[17] How can we improve our performance?

To improve student learning, we must begin by strengthening curriculum, instruction, and assessment. These fields of education have generated distinct bodies of research, couched in the different idioms of the content areas, psychology, and statistics. Only by bringing together these languages can we work together effectively to improve achievement. If schools are to motivate and educate all students, research efforts in all three fields must be aimed at helping students pose, address, and solve important, complex problems.

At the elementary, middle, and high school levels, there is increasing emphasis on the development of higher order thinking—thinking that is complex, involves multiple issues, and tends to yield multiple solutions. Higher order thinking involves dealing with uncertainty and gaps in information, applying multiple, sometimes conflicting criteria, and exerting considerable mental effort.[18]

And at all three levels, interest is growing in the kinds of assessment that can measure higher order thinking. Today's educators are beginning to take advantage of a wide range of new tests, often called performance or alternative assessments. These tests challenge students to carry out a task as they might be asked to do in the real world of work

rather than fill in blanks or answer true-false questions. The task might involve posing and solving a problem, carrying out an experiment, or making a presentation on a particular topic. Experienced raters, either teachers or other trained individuals, then judge the quality of the students' work based on an agreed upon set of criteria. A related strategy is portfolio assessment, which judges students' progress based on the evaluation of a collection of work completed during a specified period.

All of these approaches have clear benefits and, if we take seriously the overarching goal of preparing students for the challenges of the next century, they make sense. However, they are confusing for many parents (and students) who are accustomed to having a simple scorecard of their children's achievement in school. They raise complex questions about teacher and school accountability, as well as about the fairness of teachers' judgments.

Many approaches to revising curriculum and instruction to improve achievement are now being tested. Many schools are adopting complete instructional programs designed by a variety of developers, ranging from university-based research teams to private companies. These programs usually focus on a particular area of curriculum, such as reading, and they typically include curricula and materials, concrete instructional strategies, professional development, and parental involvement.

Studies are also in progress that test different ways of organizing schools and grouping students. Some, such as reducing class size in the primary grades, have proved to help children get a good start in school. Research has shown that the benefits of small class size in grades K–3 persist through grade 5, even when children have larger 4th- and 5th-grade classes.[19] Other strategies, such as mixed-age classes and inclusion classes, seek to meet diverse students' needs more appropriately. Most schools are moving away from policies that "track" students according to ability. And most are embracing strategies that ensure that every student

Challenging Standards for All

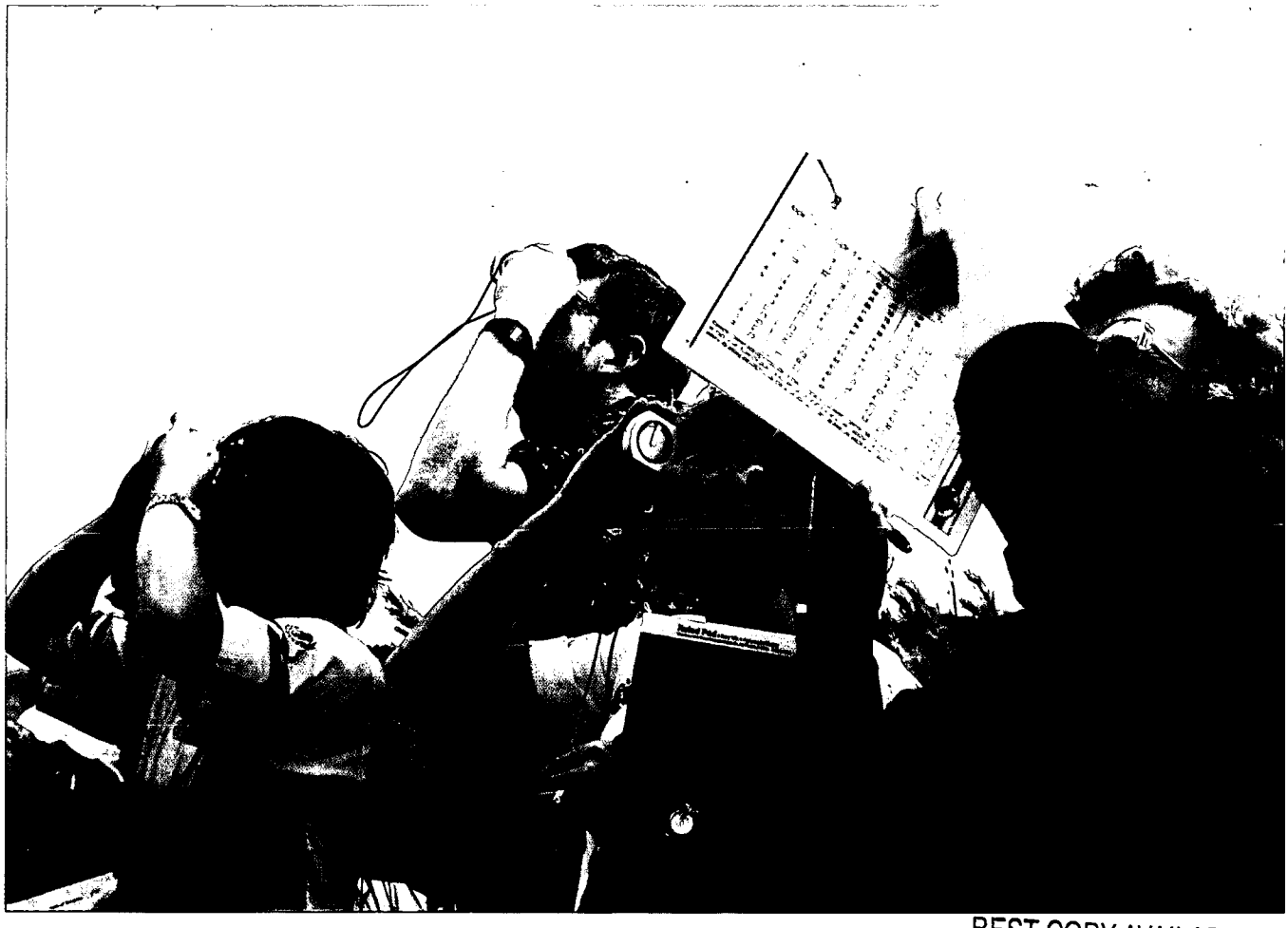
One important role of research is to help all Americans weigh the costs and benefits of the large-scale reform movements that sweep the nation from time to time. The great majority of Americans today, including three out of four parents and teachers, favor the development of challenging standards for public schools that are intended to raise achievement by defining what children should know and be able to do at key milestones in their education. At last count, 48 states and the District of Columbia had instituted, or were in the process of developing, academic standards in core subjects. There is concern, however, that these standards are not rigorous enough and are not changing classroom teaching.

Standards do not consist of grade point averages or minimum scores on tests. Rather, they constitute a set of detailed explanations and examples of the kinds of knowledge and skills that students at various grade levels can be expected to master in specific content areas. Content standards are a work in progress: many groups at the national, state, and local level are engaged in the process of establishing or adapting standards in a wide range of disciplines, including reading, writing, history, social studies, mathematics, and the arts. There is lively debate about who should be setting standards and what they should require. At this point, there is little agreement about how different sets of standards developed by different groups, at different levels, should relate to one another.

Nevertheless, a great deal of enthusiasm exists across the nation for this school reform strategy. The many proponents of standards believe that they establish, for all students, a way to learn to high levels, and in this way chart a course toward greater educational equity. In the past, equity meant that all students would receive the same educational "inputs"—the same or equivalent hours of instruction, subjects, textbooks, and other educational products and services. Content standards turn this formula on its head. They create a framework in which all students are challenged to achieve. Students may receive different kinds of instruction or services that build on their particular strengths or meet their specific needs, but they are all expected to perform at the highest levels measured by reliable and valid assessments.

How can we fairly gauge children's progress toward meeting challenging standards? How can second language learners and special education students be fairly and appropriately held to the standards and included in high-stakes assessments? What impact will the failure to reach high standards have on some students and schools? Research has a role to play in addressing these and many other issues raised by the nation's movement toward implementing high standards for all students.

See Sources for Sidebars and Data Boxes.



is well known by at least some of the adults in the school. In the lower grades, some schools are trying policies that keep the same children and teacher together for more than one year. In the upper grades, some are trying approaches that overcome the anonymity of large middle and high schools, such as smaller "houses" within large schools, alternative schools, or homeroom classes that stay together with the same teacher for several years.[20]

Students are still expected to work hard, and their families are expected to support their learning at home; but increasingly schools are being held responsible not only for providing instruction and textbooks, but also for achieving measurable results. Today, the public is demanding to know how its investments in education are paying off in terms of student achievement. Some states and cities have instituted systems for holding schools accountable by demanding a certain level of achievement on standardized tests. Other states such as New York and California have begun to conduct school quality reviews. In some states and communities, responsibility for operating floundering schools or school districts is being wrested from principals, superintendents, and elected school boards and assumed by other authorities such as mayors, state officials, or control boards, and radical remedies are being imposed.

These kinds of issues, concerns, and promising practices have currency beyond the mainstream regular class setting. In the fields of bilingual education, gifted education, special education, and in vocational and advanced placement programs, many of the same concerns about curriculum, instruction, and assessment prevail. Today, 1 in every 10 students between the ages of 6 and 17 receives special education under the Individuals with Disabilities Education Act or Chapter I of the Improving America's Schools Act.[21] In recent years, special educators have stressed that special education is a spectrum of services, not a place. That is a conceptual and legal shift that has immense implications for large numbers of students and schools. Legislation and recent judicial decisions related to the intent of that

legislation have emphasized serving eligible students within the regular education system. This approach requires significant adjustments in regular and special education policy and practice; changes in classroom instruction, supported by intensive professional development; and enough local participation to allow it to work.[22]

These concerns extend to assessment as well. Educators note that students with disabilities or language barriers have frequently been excluded from large-scale assessments. They are now grappling with how content standards and accompanying performance assessments may best be applied. Many are coming to the conclusion that the same content standards should be applied to all students whenever possible, and that many more children can be measured by the same or equivalent assessments as those without disabilities or language barriers.[23]

To build on what we know and to promote high academic achievement, problem-solving abilities, creativity, and the motivation for higher achievement, we need research on such topics as:

How can teachers educate using challenging curricula and instructional practices?

How can we improve student learning in reading, writing, mathematics, the arts and sciences, and other core subjects? How can we build on recent advances in our understanding of thinking and learning? How effective are instructional methods such as "direct instruction" and "mastery learning" when compared to commonly used alternatives? How can action research—in which teachers are key participants—result in the development and dissemination of effective practices? How can we align practice with research findings in the fields of cognitive science, neuroscience, developmental psychology, and related disciplines?

How can we set high expectations for all children?

How can schools and communities set or adapt content standards that make sense? What impact do content standards have on existing curricula, instructional approaches, and assessments? How can schools be organized to use challenging curricula?

What lessons can we learn from rich, in-depth case studies of local efforts to introduce new curricula, teaching strategies, and assessments?

How can we ensure that learning in school is supported by relationships that have been shown to inspire and foster learning? What kinds of interdisciplinary curricula have proven to be effective? How can parents and community members be engaged in this process?

How can we ensure that no student falls through the cracks between different levels of schooling or between organizational units, including regular education and special education?

What risks and opportunities are present when students cross over from one educational entity to another? How can schools be organized to make sure that transitions are supportive of student achievement? How can parents be involved in easing these transitions?

How can we align assessment more closely with the goal of fostering learning, while meeting the need for accountability and clear communications with parents and the public?

How can we best measure what students know and can do? How does a shift toward new forms of assessment affect curricular and instructional decision making? How can results be reported to parents and the public? How can the achievement of students receiving special education be accurately assessed?

How can schools and school systems strengthen accountability systems?

Which accountability mechanisms lead to ongoing school improvement? What kinds of incentives or sanctions lead to school improvement? How can taxpayers be better informed of educational investments and results?

How can new technologies be infused into curricula that help students learn and make sense of their world?

How can computers and other technologies be used to help all students learn more and perform better? How can interactive technologies be used to extend learning opportunities beyond the walls of the classroom?

- More than 3 million teachers work in the nation's elementary and secondary schools. Of these, 87 percent work in public schools.
- Almost half of all elementary and secondary teachers in public schools (47 percent) hold a master's degree or higher.
- In the 1993-94 school year, the average base salary for full-time public school teachers was $34,153. Private school teachers averaged $21,968.
- Full-time public school teachers spend an average of 33 hours per week during regular school hours, and an additional 12 hours per week before and after school and on weekends grading papers, preparing lessons, and meeting with students and parents.
- During the 1992-93 school year, 1,137 institutions of higher education conferred bachelor's degrees in education.

See Sources for Sidebars and Data Boxes.

Effective Teaching

Priority: Ensuring effective teaching by expanding the supply of potential teachers, improving teacher preparation, and promoting career-long professional development at all levels of education

While her eighth-graders work on the "Do Now," Ms. Everdale walks around the room, stopping now and then to offer praise or point the way. Some of the students finish their work quickly and wait for their classmates to finish. Many struggle with the problems, working steadily but making numerous mistakes along the way. And a few stare into space or fiddle with their pencils, lost before they even begin. How can Ms. Everdale make sure that every one of these learners meets high standards? Given the challenges of today's world, what should she "do now" to help them succeed? And when she needs help, who will point the way?

Hands-on science, cooperative learning, and inclusion for students with disabilities do not amount to much if we fail to surround children with adults who care about them. Students of all ages deserve teachers who know them, believe in their ability to learn, and take personal responsibility for their achievements. They are entitled to teachers who know their subjects, understand the diverse needs of their students, and have the professional knowledge and support needed to make learning exciting and engaging.

Effective teaching is inherently a complex, difficult task, and the quality of instruction fluctuates dramatically across the nation's districts, schools, and classrooms. Improving school achievement, therefore, requires a sustained effort to recruit, train, and license competent individuals. According to a report recently issued by the National Commission on Teaching and America's Future, roughly one quarter of newly hired teachers lack the qualifications for their jobs.

We are about to replace half of the teaching force—2 million teachers—over the next 10 years. The time to make the most of that investment is right now. In too many places, teacher education looks the same as it did eons ago, and that's part of the reason schools don't change. We need to get to work and figure out how to do it better.

Sharon P. Robinson
Assistant Secretary for Educational Research and Improvement
U.S. Department of Education

Schools with high minority enrollments are less likely to attract fully qualified teachers. Students in these schools have worse than 50-50 odds of getting a science or math teacher who holds a license and a degree in the field.[24] The Commission also reports that nearly one-third of all teachers leave the profession within the first 3 years. New teachers often leave because they are given the toughest assignments with few opportunities for ongoing education.[25]

In the next 10 years, as many as 2 million new teachers will be hired.[26] This represents a huge opportunity for American schools, since recruiting an able and diverse teacher workforce can lead to higher student achievement. There is a need to encourage more able students to enter teaching, and more men and minorities. Ethnic and racial minorities constitute about 30 percent of the nation's school population, but they account for only 13 percent of our teachers.[27] Changes in the demographic make-up of our nation make it important today and into tomorrow to include more minority teachers who can serve as role models for students.[28]

Prospective teachers need undergraduate and graduate programs that prepare them for the challenges of classroom teaching. They need a curriculum that links studies in various disciplines of the liberal arts and sciences with studies in education. This requires close and frequent collaboration between professors of education and professors of the liberal arts and sciences, both to align course content and to ensure that the instructional strategies taught in education are modeled on effective teaching.[29] A future chemistry teacher will be hard pressed to grasp the value or method of constructivist science if her own chemistry course work consists entirely of lectures and routine lab assignments. Finally, prospective teachers need preparation for taking an active part in school improvement efforts.

For teachers, learning must be continuous. Most teachers are eager to improve their practice, but have too few opportunities to do so. The nation's school districts devote a meager percentage of their resources to staff development. Estimates vary because schools have different ways of tracking their professional development expenditures, but the most generous estimates range from 3 to 5 percent,[30] far less than the estimated 8 to 10 percent of expenditures invested in staff development by most corporations and many school systems in other countries.[31]

This lack of emphasis on professional development represents a lost opportunity, since evidence is mounting that high quality, focused professional development can lead to improved student achievement. Helping teachers acquire and practice effective strategies is one of the best investments our nation can make in our children's future so long as the professional development activities are closely linked to the district or school plan for strengthening teaching.[32]

One function of professional development is to familiarize teachers with the results of research, or to engage them in joint inquiry on a particular research issue. The first step in this process is presenting forceful evidence that research is relevant to classroom practice. Research as part of professional development may be most effective when it involves the collaborative study of issues and problems that spring directly from the daily life of classrooms.

In summary, teachers, like the children in their classrooms, benefit from a broad spectrum of activities that let them define, investigate, and solve real problems, reflect on their own experiences, and collaborate with others. Finding time for regular teacher learning and conversation is a crucial aspect of any professional development agenda.

Beat the Clock

Children's curiosity is non-stop. Their need for supervision and guidance is continuous. Their desire to be known and noticed by important adults in their lives is relentless. And so, the people who devote their days to the care and education of children and young adults, whether parents or grandparents, caregivers, day care staff, coaches, or classroom teachers, have to respond to ceaseless demands on their energy and attention. Teachers know they should be reflecting on what happened yesterday, planning for tomorrow, collaborating with parents and colleagues, and mastering new skills. But many count themselves lucky if they get ten minutes for lunch.

Virtually every school reform effort, and certainly every initiative aimed at strengthening teaching and learning, requires the active engagement of teachers. Mastering a challenging teaching strategy and integrating it into day-to-day practice takes substantial time, and when schools are trying to implement major restructuring or reform initiatives, the demands on teachers' time can be particularly intense.

In contrast to teachers in many industrialized countries, American teachers have little time during the school day to devote to these activities. *Prisoners of Time*, the 1994 report by the National Education Commission on Time and Learning, noted the widely held misperception that the only valid use of teachers' time is in front of the class. It recommended that "the whole question of teachers and time needs to be rethought in a serious and systematic way."

Today, numerous reform initiatives stress collaboration among teachers aimed at collective problem-solving. To make this possible, many schools are trying out innovative strategies such as:

- *Freeing up time*: authorizing administrators, teaching assistants, college interns, or guest teachers to cover classes, freeing teachers at regular intervals.
- *Revamping school schedules:* rearranging the school day or week, such as by "banking time" (adding instructional time on four days releasing early on the fifth) or using some form of block scheduling.
- *Creating common time:* scheduling common prep or planning periods for teachers.
- *Making better use of existing time:* finding better ways to use time that teachers already spend together, such as faculty meetings and staff development days.

But making time is only one step toward effective faculty collaboration. Research shows that joint work by teachers is unlikely to bolster student learning unless there is consensus that fundamental changes need to take place; an effective process for managing the diversity of perspectives that inevitably surface; and a clear sense that collaboration is not occurring for its own sake, but rather to realize clear goals. Perhaps most importantly, schools need a very strong knowledge base. Unless teachers have an opportunity to ground their ideas and methods in research, and unless they have up-to-date information about best practices, increasing teacher-to-teacher contact may actually reinforce ineffective methods and poorly informed habits.

See Sources for Sidebars and Data Boxes.

To build on what we know, we need research that addresses such questions as:

What do we know about the factors that lead able young people to choose or reject teaching careers?

What might we learn by following, over time, the educational experiences and career paths of prospective teachers? What impact do state teacher certification requirements have on minority populations? What is the experience of immigrants who become teacher candidates?

How can the curricula of schools of education be reformed to provide competent teachers for every American classroom?

How can education courses be tied more closely to the disciplines of the liberal arts and sciences? How can prospective teachers achieve more in-depth content area knowledge? How can their preparation for teaching help them develop their own critical thinking and that of their future students? How can the relationships formed between schools of education and the local schools be strengthened? How can these relationships help to advance school improvement agendas?

What kinds of professional development are most likely to lead to school improvement and raise student achievement?

How can professional development be used to create a culture of continuous improvement in a school? What specific mechanisms can be used to tie professional development to the school's improvement plan? What role can postsecondary institutions play in continuous teacher development? What kinds of collaborative training can help special education teachers and regular education teachers work together more effectively? What kinds of professional development are needed to facilitate interdisciplinary approaches?

How can schools make time for professional development, conversation among teachers, and visitation to other schools and classrooms?

What mechanisms for professional development have proven most effective, and how can they be built into school structures? How can district administrators, boards of education, union leaders, and others be engaged in solving this problem? How can new technologies be harnessed in the service of professional development?

What yardsticks should be used to measure the efficacy of teaching?

How do we know what works? How can state licensure standards be used to improve teaching? What effect do teachers who have been certified by the National Board for Professional Teaching Standards have on student achievement? How can the impact of professional development be related to student achievement?

- Approximately 85,000 public schools and 26,000 private schools serve grades K–12.
- Expenditures per pupil rose by more than a third between 1980 and 1993—from about $4,600 per pupil to about $6,300 (in constant 1992–93 dollars). Expenditures vary widely across states and within states.
- Public schools derive approximately 7 percent of their revenues from the federal government; the rest comes from state and local government.
- Asked to grade educational performance, on average the public gives the nation's schools a C, but people give their local schools a C+.
- The problems of schools most frequently cited by the public are: (1) lack of discipline; (2) fighting, violence, and gangs; (3) lack of financial support; and (4) drug use.

See Sources for Sidebars and Data Boxes.

Strengthening Schools

Priority: Strengthening schools, particularly middle and high schools, as institutions capable of engaging young people as active and responsible learners.

> *The bell rings at the end of third period and the mass migration through hallways and up and down staircases begins again as it does every 45 minutes throughout the day. To a visitor, the scene appears to be chaotic, but the students know where to go and what to do. This is their world, and by November they know its rhythms intimately. They know the rituals of the classroom, the corridors, and the cafeteria line. They have come to expect that in some classrooms, with some teachers, they will feel special and important; and in others they will feel like names on a seating chart. And they have their own clear sense of who they are and where they fit in the school's unofficial but widely understood hierarchy of achievement and social prowess.*

All of these factors, and many more, impinge on students' day-to-day learning. Today's reform efforts are taking into account not only a school's organization and governance, but also its culture, the values and assumptions shared by the people who learn and work there, and the atmosphere that pervades its corridors and classrooms. We need to strengthen schools not only to make them more efficient, but also to make them more engaging; we need to strengthen schools not only to produce better academic records for students, but also to develop capacity for thinking, working, and spending free time in ways that will make students' lives more productive, rewarding, and interesting.

Strengthening schools means being willing to test some of our most firmly held beliefs and assumptions about schools. For example, does every child need 12 years of schooling? How would educational results be affected if some students were allowed to complete high school in 2 years and others

were permitted to take far longer? We spend more on the education of high school students than we spend on children in their early years.[33] What could research tell us about the consequences of eliminating the 12th grade and reallocating some of those resources to quality early care and education programs?

Strengthening schools also means exploring new solutions to persistent problems. In some communities, particularly in our cities, radical changes are taking place in the way schools are governed. Several states are experimenting with charter schools which provide opportunities for local grassroots school reform. Charter schools operate with public funds and are accountable to the public, but have fewer constraints than traditional public schools. Still other states and communities are experimenting with providing public support for nonpublic schools. All of these initiatives offer opportunities for research that could help us gain a better understanding of how to strengthen schools.

A strong school means better results. To improve achievement, schools need to motivate students and foster a willingness to work hard in order to achieve academic goals. Toward this end, many communities are creating smaller schools where students are known by their teachers, where teachers can work collaboratively, and where there can be more agreement on the school's mission. The aim is to create a setting that can support and sustain a culture that cherishes learners and teachers as individuals, respects the diverse experiences and perspectives they bring to school from their homes and communities, supports collaboration, and expects and rewards hard work and achievement.

Children learn better in secure settings. Surveys show that Americans want, before all else, safe and orderly schools for their children.[34] Schools have responded with many initiatives, ranging from metal detectors to conflict resolution training. But we need to know more about how to create settings where every student has the security and

sense of well being needed to learn, and every teacher has the focus and peace of mind needed to teach.

In short, communities, parents, and educators can work together in many ways to strengthen schools. But no matter which path they choose, the key to strengthening schools is ensuring that schools have the capacity to tackle their own problems. A strong school is a school that is capable of continuous improvement. A strong school can sustain efforts to correct problems and spread success. Building a strong school requires attention to the role that students themselves, as well as teachers and parents, can play in raising their achievement. But if schools are to address their own problems, they need strong, imaginative leadership and effective mechanisms for decision making.

Unless you change the quality of middle schools and high schools, they'll undo all the good work being done in early childhood education.

Gene Bottoms
Member
OERI National Educational Research Policy and Priorities Board

They also need an adequate resource base. In recent years, Americans have shown a willingness to dig into their pockets to support public education. Nationwide, expenditures per pupil rose by more than a third between 1980 and 1993, from $4,085 to $5,526.[35] But the level of per pupil spending varies dramatically from district to district, depending on the local tax base and the level of students' educational needs.[36]

Funding imbalances have resulted in complicated state formulas to assist poor school districts and have led to court challenges to state education financing systems. In fact, the supreme courts of several states have declared the state education financing systems unconstitutional due to funding inequities, and cases are pending in half of the states. Some states, such as Michigan and Kentucky, are experimenting with new financing and accountability plans. But these plans are experimental and are not widespread.

We need research that can help states and districts in their efforts to move toward more equitable funding systems and to make more effective use of existing funds. We must also define resources more broadly than dollars, and we must find ways to use these resources more creatively and more productively. Many approaches are possible, but an effective

Scaling Up School Reform

Thousands of scattered initiatives are underway today across the nation aimed at strengthening teaching and learning. When one of these experiments proves to be successful in 1 or 5 or 50 classrooms or communities, how can other places use these results? If it is successful in a larger number of sites, how can it be disseminated even more widely? And how can the best practices that emerge from educational research reach all 85,000 public schools and 26,000 private schools across the nation?

In other words, how can we harness the knowledge we have gained from decades of research and practice to bring about broad, effective school improvement? We know that innovative educational practices can make a difference for large numbers of students; but innovative practices seldom spread to more than a handful of classrooms or schools. Even those with the widest application and most solid results fail to reach three-quarters (or more) of the nation's classrooms.

"Scaling up" our most effective reform efforts means discovering how to get educational strategies that prove effective in one setting to produce comparable results in other settings. If school reform lent itself to cookbook solutions, and recipes could simply be shared with principals and teachers at other sites, this would be a simple matter. But in fact, successful reform hinges on a complex combination of factors—the mix of people who make up a school community; the political context in which reform is taking place; and the nexus of social, economic, and cultural factors that affect a community's educational needs and strengths. As a result, effective strategies cannot simply be adopted; they must be *adapted* to local conditions, resources, and needs. Tailoring a program or strategy based on those factors requires well-focused research and development efforts, drawing on the knowledge and experience of many local constituencies. And taking the next step, putting the reinvented program into practice, requires intensive, ongoing professional development.

Effective efforts to go to scale require local capacity to develop and adapt solutions to local circumstances. Teachers are crucial to this process, which requires strong incentives for teachers and administrators; frequent opportunities for teachers, administrators, and program directors to share and try out effective practices; and opportunities for policy makers to learn about how to bring about deep and sustained organizational change.

Efforts are now under way to scale up a number of exemplary programs that involve intensive schoolwide change, but these efforts are gradual and require substantial investments of resources. It took 7 years of local implementation efforts for Success for All, a well-tested comprehensive restructuring program for at-risk children in the primary grades, to be adapted to 200 schools—less than one-half of one percent of all Title I schools. Plans are now under way to bring Success for All to 3,000 schools by the year 2002. Other schoolwide reform projects, such as the Coalition of Essential Schools, the Accelerated Schools Project, the School Development Program, and the Annenberg initiatives, are also trying to take their improvement efforts to scale. Indeed, if all of these and similar efforts prove to be successful it is possible that by the year 2000, 10 percent or more of all public schools could be involved in intensive, focused school improvement efforts. The challenge in coming decades will be to bring school reform, based on well-tested, effective strategies, to the other 90 percent.

See Sources for Sidebars and Data Boxes.

school accountability system supports each school's right to receive from the district and the state the resources and assistance it needs to ensure that its students can meet appropriate standards.[37] We need research that can help states and districts design or adapt such systems to their needs.

Strengthening schools means testing new ideas about what schools are and what they can do to foster student learning. For example, educational technology, with its "interactivity" and "connectivity" and its capacity to allow "anytime-anywhere" learning, has opened up new ways of thinking about how learning takes place, and when and where it can occur. Furthermore, software applications can support the administration and management of schools, as well as local assessments, allowing educational leaders to use existing resources more efficiently.

Strengthening schools is a massive undertaking that requires a reconsideration of policy and practice in many areas. In all of these areas, decision making needs to be grounded in solid, up-to-date research. To build on what we know, the nation needs research that addresses such questions as:

How can the schools become better integrated into the communities they serve, and how can communities mobilize to take more responsibility for their schools?

- How can school buildings be used to provide better support for children and their families? How can communities take active part in shaping educational policy and practice at their local schools?

What are the processes by which school communities can develop a focused vision, clear standards, a more coherent organization, and a climate more conducive to learning?

How can school communities composed of students, parents, teachers, administrators, and community members, develop a greater capacity to define and solve their own problems? How can we create schools large enough to span diverse communities, but small enough to give individuals the warmth and support they need to learn and teach effectively?

What new approaches to dividing resources among the various levels of schooling might improve results for learners?

Given the proven power of early learning, should we consider shifting resources from older to younger students? Should some students be allowed to progress more quickly through school while others take more time? What are the effects of alternative grade structures?

What do we know about the benefits of different approaches to making schools safe and orderly?

What factors make some schools more safe and orderly than others operating in similar circumstances with similar enrollments? How can parents and communities be involved in efforts to improve discipline?

How can new technologies be brought to bear on reforming how schools are organized, how instruction is delivered and supported, and how results are documented and communicated?

How can new technologies be infused into the mission of the school? What kinds of partnerships with local employers and postsecondary institutions can help schools integrate technology into their operation? How does introducing technology into a school affect curriculum, instruction, professional development, and other aspects of its functioning?

Which new models of schools are likely to improve results?

Which innovative school financing models hold promise for improving equity? How can schools redirect existing funds to activities and programs that have been shown to boost achievement? How can communities allow school choice while assuring equity? What lessons can be learned from charter schools? Which communities are likely to benefit most, and least, from contracts with private companies to manage public schools?

- Nationwide, 66 percent of students in public elementary and secondary schools are white, 17 percent are black, 13 percent are Hispanic, 4 percent are Asian or Pacific Islander, and 1 percent are American Indian/Alaskan Native.
- Black and Hispanic students together make up more than half the students in the nation's central city public schools.
- More than 3 million school-aged children speak English with difficulty.
- Despite narrowing of the gap between the performance of white and black students on the National Assessment of Educational Progress (NAEP) in mathematics, reading, and science, white students still had higher average scores in 1994. The gap in writing scores has remained relatively stablee since NAEP first assessed writing in 1984.
- While all groups have made gains in the rate of high school graduation over the last quarter century, black and Hispanic students are still more likely to drop out of school than white students. Hispanic students have the highest dropout rate; and have shown the least improvement.

See Sources for Sidebars and Data Boxes.

Student Diversity

Priority: Supporting schools to effectively prepare diverse populations to meet high standards for knowledge, skills, and productivity, and to participate fully in American economic, cultural, social, and civic life.

Dmitry takes the forgotten lunchbox from his mother and silently rebukes her for calling after him so conspicuously on the street; he wants his friends to think of him as a real American. Adela walks her little sister to her kindergarten class, chatting about the birthday surprise they're planning for grandfather, when the principal passes by and sternly reminds them to speak English. They stop talking. Lloyd slides into his seat in homeroom, wondering why people are so concerned about the hat he wears in class, but so unconcerned about his future.

Diversity is hardly a new concept. Throughout history, different groups of people have had their own ways of making sense of the world and of representing their own values and beliefs. The people of the United States have a long political tradition of struggling with particular issues of diversity, while embracing the general principle of diversity within unity: *e pluribus unum.* What is unprecedented, however, is the active effort to transform educational perspectives from seeing the nation as a melting pot to seeing a rich interaction among many distinct people: male and female, from diverse racial, ethnic, social, and economic groups. This view of the nation enables all students to find their own experiences represented in the curriculum; to interpret the curriculum through the lens of their experience; to profit from the kinds of learning opportunities offered both inside and outside the classroom; and to have equal opportunity to experience educational success and mobility.

In my district we have 47 different languages and 20 different dialects, and we need to have everything translated into at least five languages to even begin to communicate with our public. We need more research focused on how we can train teachers to work in classrooms with youngsters who come from such a wide variety of not only languages, but of cultures as well.

Mary Frances Callan
Superintendent
Milpitas Unified School District
California

The growing consensus across the nation that educational endeavors of all kinds need to respect and reflect diversity stems, in part, from the belief that cultural differences affect children's and adults' ways of knowing about the world. Studies in many fields substantiate this belief. Psychologists studying how people think in different cultures have shown that perception (how we take in information about the world) is shaped by the way that experience is modeled in a particular social and cultural setting.[38] For example, children raised in a culture whose stories are meant to capture the cycles of nature may have difficulty following a teacher's instructions to write a narrative with a beginning, a middle, and an end. And children brought up in a culture that considers direct eye contact to be disrespectful may have difficulty understanding their teachers' desire for their direct attention.

This focus on the impact of culture is intensifying as the enrollment of minority populations in U.S. schools grows. In 1993–94, one in three elementary and secondary students was a member of a minority racial-ethnic group.[39] In the two decades between 1973 and 1993, the black enrollment in grades 1 through 12 rose from 14.8 percent to 16.7 percent, and Hispanic enrollments more than doubled from 5.7 percent to 11.9 percent. Hispanic students now account for one-fifth of the enrollments in central city public schools and will constitute the nation's largest single minority group early in the coming century.[40]

Language diversity is another factor that distinguishes learners from one another and affects the capacity of some children and adults to benefit from available educational opportunities. Although almost inseparable from culture, language diversity is a distinct challenge whose importance is growing as the makeup of the nation's school population changes. Nearly four million elementary and secondary students who attend public and private schools come to school each year unable to speak or understand English.[41] These children represent more than 100 language groups. Even children within the same language group come to

school with markedly different educational backgrounds and experiences. Most of these children learn English quickly, acquiring basic proficiency in two to three years. But many learners at all levels of education need substantially more time to master their new language well enough to learn easily in it and to experience academic success.[42] For too many of the nation's language minorities, the twin goals of bilingual education (learning English as rapidly as possible while maintaining academic progress) have proved elusive under current education practice.

Culture and language are not the only factors that set children apart from the life of the school. Socioeconomic status is an equally powerful, if not more powerful, force. Poor children, no matter what their race or ethnicity, are unlikely to fare well in America's schools.[43] These are the children for whom traditional schooling has provided the most limited opportunities to succeed. Little is expected of them and they are treated accordingly. Of all American students, poor children are the most likely to be placed in low academic tracks, the most likely to be retained in the same grade for more than 1 year, and the most likely to leave school without graduating.[44] Studies have shown clear differences in expectations that teachers hold for students in low-income (compared with middle-income) schools, as well as differences in instructional strategies and coaching on how to behave in school.[45] These differences appear to take hold in the earliest years of schooling.

Diversity cannot be an "add-on" to a school's culture or curriculum; it cannot be an afterthought by well-meaning educators. Effectively educating diverse learners means basing policy and practice, consistently and continuously, on the principle that no matter what their circumstances, all learners have strengths on which to build, and that if these strengths are understood and nurtured, all students can meet high academic standards.

The Importance of Context

Can academic questions lead to answers that will make a difference for children and teachers? Can they respond to the pleas of teachers who wonder, "What shall I do in my classroom on Monday morning?"

These were the key questions that Shirley Brice Heath set for herself some 20 years ago as she embarked on a study of Trackton and Roadville, two culturally different communities in the Piedmont Carolinas. Trackton was a black working-class community whose older generations had been brought up on the land, farming their own land or working for landowners. Roadville was a white working-class community whose residents had been part of mill life for four generations. An ethnographer of communication and a teacher educator, Heath wanted to know how children in these communities learn to use language in their homes and their communities, and how teachers' knowledge of children's ways with words allowed them to bring these ways into their classrooms. Her research is contained in *Ways with Words: Language, Life, and Work in Communities and Classrooms*, published in 1983 .

Heath found that to understand the children's literacy needs and strengths, and the kinds of instruction and curriculum that might be needed to fortify their language skills, she needed to understand fully all of the face-to-face interactions the children have in their homes and communities.

What does it mean that residents of one town speak of children "comin' up," while adults in the other talk of "bringin' up" their children? How do children in each town come to know which kinds of talk are for inside the house, and which for outside? And what happens when they reach school and are flooded by discontinuities in the way people talk and the values they hold? How do children learn "code switching"?

Heath made an exhaustive study of the language-learning habits of the children of the two towns, accounting for the context in which this learning took place: "the ways of living, eating, sleeping, worshiping, using space, and filling time which surrounded these language learners." She studied the towns' oral traditions, recording the babbling of an 18-month-old in his crib, and listening to children tell each other stories in a sandbox. She looked at parents' notes excusing their children for school absences. She analyzed worship services and notes left for the mailman.

Heath went beyond description to suggest how insight into different oral and written traditions can help teachers strengthen their students' literacy skills. Many other researchers have followed her lead, producing studies that focus not only on what children know, but on how, in their homes and communities, they have come to know it. They have demonstrated the crucial importance that context plays in education and in the research that supports it.

See Sources for Sidebars and Data Boxes.

Helping diverse learners succeed means taking seriously the results of research on resilience—the ability to adapt to changing circumstances to survive. Children who live in poverty can succeed in school if they receive sustained attention from individuals and institutions committed to their success and from programs designed to meet their unique needs. Children do best when they have the personal involvement and material support of their parents. But those who have difficult or stressful home lives can thrive if they have guidance and emotional support from other important adults in their extended families or their communities, or if they take part in adult-led community groups.[46] Every learner must receive the clear message that demography is not destiny; that the keys to a bright future are hard work, effective teaching, and strong relationships with caring adults, not the circumstances one is born into or the abilities one is born with.

Research shows that virtually all parents, regardless of their circumstances, share high aspirations for their children.[47] But competing pressures and uncertainty make it difficult for many parents to act on these aspirations and participate in their children's education. For many parents, schools are intimidating places where no one would be likely to understand or act on their concerns. Cultural and linguistic factors can make participation in schools difficult. Many parents feel ill at ease, because they lack knowledge of school protocol, remember their own unhappy past school experiences, or just feel unwelcome. However, research shows that parental involvement in the education of their children is another key to success. How then, do we deal with these conflicting facts?

Effectively educating diverse learners means building these findings into all educational reform efforts, particularly the movement to raise the nation's expectations for all students. Underlying the push for high standards is the belief that all students are capable of achieving them. If we are to make this belief a reality, we must find ways to take full advantage of learners' unique and inherent strengths. We must gather

information and build knowledge that lead to instructional practice that is both demanding of students and responsive to their diversity. We must gather information and build knowledge that enable educators and policy makers to make the school a more inviting place for students and parents alike. And, we must gather information and build knowledge that provide for greater access to the kinds of educational advances and opportunities that all of us want our children to enjoy.

To build on what we know, we need research addressing such questions as:

How can we help teachers gain insight into the ways that diverse students learn?

How can insight into the ways that diverse students use language and other symbolic systems to create meaning, help teachers build on students' strengths and improve their achievement? What are the classroom dynamics that influence learning in schools with ethnic and language diversity? What interventions hold promise for promoting learning in such schools?

How can parents and community members be engaged more effectively in their children's education, particularly in the area of literacy?

How can schools more effectively reach out to diverse parents, including recent immigrants? What kinds of family literacy programs appear to be effective? What are the obstacles to parent and community engagement in local schools, and how can they be overcome?

How can schools ensure equity while setting high standards for all learners?

How can we ensure that the standards set or adapted by schools or school districts reflect the values and concerns of their communities? How can we ensure that diverse learners receive the instruction and support they need to meet high standards?

How can schools ensure that language-minority students meet high standards?

How does the English language proficiency of students influence the learning of content areas, such as mathematics, science, and history? What changes need to occur so that language minority children are included in high-stakes assessments? How can evaluation of programs for limited English proficient students be improved?

To what degree does current research on student achievement distinguish between issues of ethnicity and issues of economics?

How can research delineate the effects of socioeconomic status on racial or ethnic groups?

How can technologies be used to assess and meet the needs, and enhance the strengths, of diverse learners?

How can we ensure that all learners including those from all ethnic and racial groups, all language backgrounds, and all socioeconomic levels have equal access to educational technologies at school? What kinds of community efforts can expand the access of low-income learners to technology during the out-of-school hours?

- There are approximately 50,000 before- and after-school programs across the nation, serving approximately 1.7 million children.
- The proportion of students who read for pleasure on a daily basis declines with age.
- Computers are used at home by one in four elementary and secondary students.
- By the time they complete 11th grade, 80 percent of students report that they have held a part-time job.
- Seven out of ten eighth-graders report that they participate in outside-of-school activities.

See Sources for Sidebars and Data Boxes.

Learning Beyond the Classroom

Priority: Promoting learning in informal and formal settings, and building the connections that cause out-of-school experiences to contribute to in-school achievement.

At day's end, the school bell rings and classrooms empty. As children pour out of the elementary school, some wait for buses that will take them home or to after-school programs. Some go to music lessons or religious classes. Others wend their way home on foot or bicycle, or stop at the corner store to check out the latest comic book or video game. By some estimates, more than half the children go home to houses or apartments where no adult is around to supervise.[48]

At about the same time, the middle and high schools are ending their school day. Some students hurry to soccer or basketball practice or get on the bus for the swim meet across town; others head for hoops at the park. Some spend the afternoon rehearsing for the school play or going on-line at the computer lab. Some are in detention. A few volunteer in community organizations. Many have after-school jobs. And some are hanging out on whichever corner, schoolyard, or arcade they see as their turf.

Our young people spend an immense number of hours outside the classroom, and what they do with this time has significant bearing on school achievement and social development. In elementary school years, nearly 2 million children spend their afternoons in after-school or extended-day programs.[49] Extracurricular activities keep many youngsters, particularly middle and high school students, on school grounds after 3 p.m. Students who take part in extracurricular school activities such as intramural sports, student government, publications, and special-interest clubs generally do well academically and learn to manage their time effectively.[50] Parents sometimes worry about letting their children take part in school

The notion of integrating research results into the development of solid, interesting, community-based educational programs, and the idea of generating new knowledge out of those programs, are just now on the cusp. We need to support this fragile trend.

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activities if their schoolwork slides, but if the activities take no more than a few hours a week, they may actually help students develop a positive connection with the school and with their classmates.[51]

Participation in extracurricular activities appears to benefit many students. Some of the benefits documented by researchers include increased cross-race contact, fewer at-risk behaviors, and later participation in voluntary organizations.[52] Recently, however, some studies have raised new questions about the impact of extracurricular activities on achievement.[53] Does participation in school activities boost grades? Or are students with higher grades more likely to go out for the wrestling squad, the debate team, the newspaper, or the drama club? Are those with strong academic records more actively courted by faculty coaches and advisers? Are students from low-income homes, those with disabilities, or youngsters with limited English proficiency given the encouragement and assistance they need to take part in a wide range of school activities? These are questions that researchers need to pursue.

Although some children are overburdened with after-school activities,[54] others have too few opportunities to take part in them. While students from lower socioeconomic backgrounds appear to benefit most from participation in extracurricular activities, they often have less access to them. High poverty schools, particularly those in urban settings, tend to offer fewer after-school activities, including sports, and have lower rates of participation. Students in these schools are also less likely to hold after-school jobs. Much of their out-of-school time appears to be unstructured. These students spend less time doing homework. Many parents worry about drugs, violence, inappropriate sexual activity, and long stretches of time spent in front of the television.[55]

Finally, research suggests that after-school programs and extracurricular activities are not sufficiently aligned with the curricula that children are experiencing in the classroom. Such programs miss many opportunities to support and

reinforce the school's instructional goals. They often fail to take advantage of the full range of resources available in the school and community. We need better ideas about how to foster collaboration so that our young people experience, throughout the school day, after school and throughout the school year, a coordinated and coherent learning environment.[56]

Out-of-school hours can present many opportunities for enhancing and reinforcing learning. During this time, many people and institutions affect children's development. To be sure, parents and families exert the greatest influence on their children's learning. Parents can strengthen their children's achievement by ensuring they have the love and care they need from the moment they are born; seeing to it that they stay safe and healthy as they grow; providing supervision and control; spending time with them, reading to them and sharing learning experiences with them; setting high expectations for them; and helping them link up with people, programs, and resources in their communities.

In addition, parents have a crucial role to play in supporting the efforts of schools. Research shows overwhelmingly that parent involvement in their children's education improves children's achievement, and that the more that parents are involved the more achievement improves. Parent involvement programs and other interventions have been shown to produce higher grades and test scores for children, better attendance, more completed homework assignments, fewer referrals to special education, more positive attitudes and behavior, higher graduation rates, and greater enrollment in postsecondary education. Programs designed to encourage extensive involvement of low-income parents have been found to raise children's school performance to levels usually achieved by students from middle-income families.[57]

Much of learning occurs outside of schools, in the home and in the community. Education research needs to look beyond the classroom.

Edmund W. Gordon
Member
OERI National Educational Research Policy and Priorities Board

What About Sports?

As children grow, it sometimes seems that the three Rs get replaced by the three Ss—schoolwork, socializing, and sports—and not necessarily in that order. Parents and teachers are eager to help young people find the right balance among these activities. But what is the right mix? Do students who take part in organized athletics fare better in the classroom? Or do sports distract students' attention and divert the school's educational mission? These questions have been debated for years, but the jury is still out.

Today, sports programs welcome children of all ages. Many toddlers now take part with their parents in gym programs designed for very young children. Millions of American children take part in the programs of Little League Baseball, Pop Warner Football, the U.S. Ice Hockey Association, and the American Youth Soccer Association. Many voluntary organizations such as the YMCA and YWCA sponsor programs in a wide variety of sports, including basketball and swimming.

In the elementary school years, there tends to be less concern about the impact of sports on schoolwork than on equitable access to athletic programs. The role of sports in the lives of older students is more controversial. Proponents of school sports cite studies that show that athletes' grades are higher than those of nonathletes. For example, a large study conducted in 1986 found that on average, athletes' grades were consistently higher; moreover, athletes were less likely to receive a failing grade while they were competing. But other studies paint a more complex picture. They suggest that participating in sports does not make young people better students; rather, those who are faring better in school are more likely to go out for sports.

Research also shows that participation in sports has different impacts on different groups of students, depending on their gender, socioeconomic status, and geographic setting. A study of 13,000 student athletes issued by the Women's Sports Foundation concluded that taking part in sports boosted achievement for only 3 of 18 groups studied: rural Hispanic females, suburban black males, and rural white males. Debate about high school sports has focused, in particular, on participation by young black men. Some have argued that unrealistic athletic aspirations may keep them from focusing on schoolwork or gaining other marketable skills.

Some researchers have documented efforts by teachers and coaches to encourage achievement and character building through participation in sports. They have studied programs that require all student athletes who do not maintain a C average to take part in mandatory study halls, where they receive tutorial assistance. Such programs deliver the message that athletics and academics are inseparable, and appear to be effective.

Finally, some observers of high schools express concern not only about the impact of sports on individual students, but also on the culture of the school itself. Competitive sports programs can help schools hold some students who might otherwise drop out. And "school spirit" driven by competitive sports can be meaningful if it is directed to the school's educational mission. But as one observer has written, "the sports tail often wags the academic dog." The key is to create settings—homes, schools, and communities—where sports are used to further the educational goals of schools.

See Sources for Sidebars and Data Boxes.

Communities need to surround children with a strong, well-coordinated set of supports. They need to ensure that key learning institutions work more closely together, engaging a wide range of concerned people in the process of setting and realizing learning goals for healthy child development. This web of relationships is not simply a backdrop for development. It is the medium of learning.

This web of relationships can involve a wide range of community-based organizations: human services, religious groups, voluntary organizations, sports and recreational associations, arts programs, and local businesses. It can include cultural institutions such as museums, libraries, theaters or movie houses, and historical societies. This web can link early care and education providers and schools with institutions of higher education, adult education programs, and corporate job training programs.

When school buildings are kept open after school and during weekends, they can become hubs of community activities and services such as day care, after-school programs, second language classes for adults, and meetings of various community organizations.[58] We need to know more about how such arrangements can reinforce, rather than derail, the school's educational mission.

To build on what we know, the nation needs research that will address such questions as:

What can families do to support children's learning?

What are the obstacles to family involvement and how can they be overcome? What can we learn about how to strengthen family, school, and community partnerships in learning? How can parents from immigrant communities be encouraged and supported to take part in school activities? What kinds of programs can help parents and children learn together? How can parents who have had few educational opportunities themselves help their children learn to read?

What effects do extracurricular and cocurricular activities have on student achievement?

What types of activities have the most positive effects, and what is the best way to organize them? What connections should exist between a school's curricular activities and its extra- and cocurricular programs? What can these findings tell us about the criteria school boards, district administrators, principals, and school-based decision-making teams use when they decide which programs to support, and which to discourage?

How can we link schools with community organizations that provide learning opportunities for children and youth?

What lessons can be learned from efforts to form schools, such as charter schools and other innovative schools, that involve ongoing collaboration with community organizations? How do the curricula, instructional strategies, and assessment practices that emerge from these collaborations align with state standards now being developed in various content areas? How can such programs ensure the flexibility they need while remaining accountable for results?

How can parents and after-school programs get the most benefit for children and youth from community resources, such as universities, museums, and libraries?

What constitutes quality in out-of-school cultural activities? How can families with limited means get equitable access to a community's cultural resources for their children? What factors contribute to the success of high-quality learning opportunities for children during out-of-school hours when parents are not available? How do specific activities or strategies within programs affect participant outcomes? How can families and out-of-school programs coordinate their activities more closely with the curricula that their children are experiencing during the school day?

How can we bolster the social networks within communities that strengthen families and enable children to do better in school?

What can we learn about the effects of tutoring, mentoring, enrichment activities, and youth organizations on long-term development and learning? What kinds of within-school and out-of-school relationships with caring adults have the most long lasting, positive results? What are the effects of peer relationships, including gang activities, on learning and development? How can these influences be turned into positive factors in a young person's development?

What does it take for schools to build productive, lasting partnerships with other educational institutions, businesses, private institutions, and other public agencies?

What is needed to keep such partnerships focused on student learning and development? What constitutes quality partnerships?

- Of adults over the age of 24, 81 percent have completed 4 or more years of high school; 22 percent have completed 4 or more years of college.
- More than 15 million people are enrolled in institutions of higher education; 3 out of 4 attend public institutions; 1 in 5 of all B.A. recipients major in business management—the most popular undergraduate major.
- Nearly one in three full-time workers receives skill improvement training on the job. College graduates are more likely to receive on-the-job training than workers with less formal education.
- Estimates indicate that 12 million adults have limited English proficiency.
- Nearly half (46 percent) of adult workers use computers on the job.

See Sources for Sidebars and Data Boxes.

Adult Competence

Priority: Understanding the changing requirements for adult competence in civic, work, and social contexts and how these requirements affect learning and the futures of individuals in the nation.

> *After the dinner dishes are cleared, the children start their homework. Sometimes the older members of the household share the kitchen table with them. Dad has found an error on this month's credit card bill and needs to write a letter to the company. Grandma has folded back her newspaper and is reading an editorial about air pollution. Mom has brought some papers home from work and is looking at a series of pie charts. For many Americans, tasks like these present no problem. But according to the National Adult Literacy Survey, nearly one-half of American adults cannot read or write English well enough to write that letter or fully grasp that article, or use the information from those charts.*[59]

Many adults lack the wide range of competencies needed to negotiate everyday life and work in today's complex world. Most adults function in a variety of settings and need multiple competencies to meet the particular responsibilities and expectations associated with each one. Many adults need to master the sophisticated technologies that dominate today's workplaces. They need the practical information and varied skills required to choose a health insurance plan or complete a tax return, to locate and succeed at continuing training and education programs, and to function effectively in their communities. These challenges are daunting for any adult, but for those who live in poverty or have weak educational backgrounds, they often seem overwhelming.

Responsibility for preparing Americans to succeed in the next century stretches well beyond the boundaries of homes and schools. Postsecondary institutions, including the full

We need to understand how to develop "just-in-time" learning strategies that last a lifetime, so that learning opportunities can be structured and delivered exactly when the individual needs them—whether a young child in school or an adult in the workplace.

Ted Sanders
Co-Chair
OERI National Educational Research Policy and Priorities Board

range of 2- and 4-year colleges and research universities, are being challenged to orient their curricula and instructional strategies to the needs of today's learners and tomorrow's workplace. These institutions are struggling to meet those challenges while preserving the independence and pursuit of knowledge for its own sake that have been so vital to American higher education.

Employers in every sector of the nation's economy are recognizing that high worker productivity hinges on the ability to create settings and incentives for continuous learning. More and more corporate decision makers are recognizing that when their workers lack important skills, they can't simply rely upon or blame schools and colleges; they have to make significant investments in education and create a corporate culture where learning is expected and rewarded.

But adult learning is not just a matter of increased productivity. Americans of every age need to acquire the kinds of skills and knowledge that will help them be better parents; better informed voters; and more active participants in the nation's civic and cultural life.

As a nation, we tend to focus on the first two decades of life, with relatively little attention on the next four or five decades. What does the nation need to know to ensure that at every stage of life, Americans have appropriate opportunities to learn? In coming years, educational researchers and practitioners will have an important role to play in addressing this question. They will need to consider all of the settings where adults learn: in college and university classrooms, on the job, in community-based adult education courses, at home, and in cyberspace.

Wide access to higher education is one of the great achievements of American democracy. But the quality of instruction across the broad spectrum of the nation's postsecondary institutions remains a problem. As in K–12 education, reform efforts have sometimes been paralyzed by

the collision of conflicting impulses: the commitment to providing access to higher education for all Americans, including those who are underprepared, and the determination to set high standards and achieve excellence. In the realm of higher education, there is no consensus on what constitutes excellent teaching, and no systematic effort in place to improve pedagogy.[60]

A dramatic development in higher education over the last three decades is the growth of community colleges. Thirty years ago, there were 1.3 million students enrolled in American community colleges.[61] Enrollment figures rose rapidly in the late 1960s, as new 2-year institutions opened their doors on the average of one a week.[62] Now, more than 5 million students are enrolled in 2-year colleges.

Community colleges face complex challenges. Compared to students in 4-year colleges and universities, community college students tend to be older. Almost one-half of community college students are over 25, compared with 30 percent of undergraduates in 4-year schools.[63] Students at 2-year colleges are slightly more likely to be members of minority groups, but Hispanic students are much more likely than other minorities to attend 2-year institutions.[64] Students arrive in community college classrooms with very different purposes and needs. Young adults may need organized, academic, discipline-based credit courses which will transfer to 4-year institutions. An executive may need to learn some Japanese. A homemaker who wants to start a business may need to know how to navigate the Internet.

Today's employers are turning to colleges and universities to help them ensure that workers are keeping up with the changing realities and demands of the modern workplace. A recent survey showed that human resources officers' top two concerns for the next decade are maintaining the skills needed by workers and managing change. Corporate leaders are concerned that a decade from now, the "shelf life" of most job skills will be only 1 to 3 years.[65]

Digital Family Rooms

Electronic learning is gradually transforming many classrooms across the nation. But adults as well as children can benefit from educational software. As they pursue continuing education and try to upgrade their skills, they stand to gain tremendously from the vast resources now available on the Internet. But not all Americans have easy access to these tools. Two out of three adults do not have a computer at home. Nine out of ten adults whose family income is less than $20,000 have no computer at home.

A number of efforts are now under way across the nation to expand the access of adults and children, especially those living in low-income communities, to the information, training, and job possibilities available with today's telecommunications. The idea is to make technology available in easily accessible public places, such as community centers, malls, and churches.

Digital family rooms, located where people live, are proliferating. They can be found in New York City's Lower East Side settlement houses, neighborhood programs like "Plugged In" in East Palo Alto, California, or the Edgewood Terrace project in a high-rise public housing complex in Washington, D.C.

Campus of Learners is one such program that is geared to adult learners. Established by the Department of Housing and Urban Development and supported with private funding, Campus of Learners provides computer technology in college-like settings right in housing projects. In its first year, the project is expected to operate at 12 to 15 sites; each will be linked with a local college or university, and will be able to "downlink" a variety of courses.

In some cases, communities are mobilizing to expand their residents' access to technology. Some are developing their own neighborhood networks through Free Nets. Examples include the Electronic Village in Blacksburg, Virginia, and La Plaza in Taos, New Mexico. Various cities are experimenting with ways to link schools, community institutions, and homes—including the homes of low-income residents. In Pittsburgh, Pennsylvania, funding from the National Science Foundation has supported the creation of a citywide network for use by schools and community organizations. In addition, public libraries in many towns and cities introduce patrons to the vast resources available through the Internet, providing both the equipment and training needed to take advantage of them.

These efforts are all experimental, and educational researchers—working closely with program patrons and community members—will play a key role in coming years in evaluating existing programs and guiding future initiatives.

See Sources for Sidebars and Data Boxes.

Responding to these challenges, the nation's largest corporations have, over the last decade, begun to build up their training capacity. The percentage of American workers who have received training to improve their current job skills rose during the 1980s from 35 percent to 41 percent.[66] In 1990, the Commission on the Skills of the American Workplace estimated that American companies spend some $30 billion per year on training; other sources set this figure much higher.

To meet the learning needs of tomorrow's workforce, employers could benefit from research aimed at improving the training they provide. Many human resource policies and practices were designed for a younger, more homogeneous work force, competing in a different world.

Although we know some of the competency requirements generated by workplaces, we know very little about developing the other adult competencies required to live in the complex America of the 21st century. We will be required to deal with changing political and social realities. Computers and new information technologies will create a shrinking, fast-paced world of global competition. Innovations in medical technology and genetic engineering will change the meaning of life, as we struggle to maintain personal values and ethics. What sorts of competencies will Americans need? How will they acquire them?

To build on what we know, we need research that addresses such questions as:

What instructional strategies have been found to be most effective in postsecondary institutions?

Which mechanisms have been most effective in encouraging faculty to adopt these strategies? Which kinds of ongoing professional development, geared to improving instruction, would be accepted and effective on college and university campuses?

How can our knowledge of different ways that adults learn be used to help them acquire skills necessary for work, community, and cultural life (for example, reading skills, computer skills, and fine arts)?

How do adults learn? Do theories of learning developed for children and adolescents apply to adults? What are the most effective instructional strategies for teaching adults new skills?

How can community colleges meet the challenges of conflicting demands?

How will the diverse mission of community colleges be affected by the trend toward universal K–14 education? How can harmony best be established between new school-to-work missions and general education? What have community colleges discovered to be the best means for quality control in curriculum and delivery systems under conditions of multiple mission?

How can employers, community organizations, cultural institutions, and institutions of higher education collaborate on research that would shed light on the ways of knowing and learning that characterize a diverse adult population?

What kinds of work schedules, joint ventures with colleges or universities, and mentoring arrangements would allow adults to pursue education while working full time? Which approaches to basic, continuing, and remedial education offer most promise at the postsecondary level? How can postsecondary institutions better use pre-collegiate outreach programs to preclude the need for remedial education in college? What lessons can be learned from other countries about adult education in a variety of settings in these and similar partnerships, and how should their benefits be evaluated?

How can new technologies, including on-line learning opportunities, enhance both equity and excellence in postsecondary and adult education?

How can communities help to close the gap between technology "haves" and "have-nots"? How can on-line course work help adults gain the knowledge and skills they need without isolating them?

How will we understand the changing requirements for adult competencies in civic and social life?

How will these requirements affect adult learning? Who teaches adults these competencies? What happens to people who don't meet such requirements?

Chapter 3

Putting the Priorities To Work

The aim of research is not just to stockpile knowledge, but to achieve a deep understanding of what education means in today's world and how it can be strengthened. To be sure, education research is a form of scientific inquiry. But it is not only about knowing, it is also about doing. To paraphrase IBM chief executive Louis Gerstner, it is not only about predicting rain, it is also about building arks.[1] For each of the seven priorities, we need to develop new concepts, ideas, and tools. We need sound ways to test our hypotheses, to document our experiments, and to communicate the results. We need ways to understand how the many findings that emerge from research relate to each other. And we need new ways to tie together the knowing and the doing.

In establishing the seven priorities, the Assistant Secretary and the National Educational Research Policy and Priorities Board challenge Americans in every walk of life to get involved in the process of educational improvement and to take greater responsibility for results.

Learners of all ages can find ways to reflect upon and communicate their own educational experiences, using the seven priorities to focus their thoughts. They might begin simply by describing times in their lives when they have learned something—in or out of school. They can read and interpret these narratives together. In this way, the priorities can become the basis for conversations with classmates and teachers about how they learn, and how schools and schooling might be changed so that they learn more. In the process, students can play a role in ensuring that learning is at the center of all reform efforts.

Parents can become critical consumers of research as well by taking a look at their communities and schools through the lens of the priorities. Are efforts under way, in each of the seven areas, to strengthen policy and practice? Are the new programs or initiatives being tried in their children's early care and education programs rooted in research? What kinds

of research are being supported by the district or the school? Does this research ask important questions aligned with the national priorities? Can it lead to educational improvement at the local school? To what extent are parents' perspectives on research needs taken into account? Can the research design be changed to tap parents' knowledge and reflect their concerns?

Teachers, including those involved in early care and adult education, can use the priorities as a framework for their efforts to continuously improve their own practice, and to contribute to school- and district-wide improvement efforts. They can broaden their own concept of teaching to encompass research, which can mean visiting another teacher's class; keeping a journal to document what they are doing day by day in their classrooms; using research to help them make decisions about their teaching; or making a more systematic effort to relate the ups and downs of their students' performance to their own curricular and instructional decisions. They can take part in action research, using the research questions in this document as the basis for improvements in their own classrooms or as a springboard for conversations with students, parents, colleagues, and administrators about how the gap between research and practice can be narrowed.

Teachers can also be active, demanding, and critical consumers of research. This requires gaining the skills needed to evaluate and access research in libraries and on the Internet and to judge the quality of the information located. This can also include reaching out to other teachers, schools, professional associations, universities, and government agencies for help in locating and applying research findings relevant to their classrooms and students.

College and university faculty can urge or initiate research and development that is aimed at improving learning and teaching at the postsecondary level by using the national education research priorities plan as a starting point. They can engage graduate students from every discipline in

research on strategies for effectively transmitting the knowledge base in their field to students and colleagues. They can give newcomers the tools and inspiration they need to advance the field. Professors in the liberal arts can collaborate with colleagues in schools of education to get a sense of how pedagogical principles might be appropriately modeled in and adapted for college classrooms. Postsecondary institutions can also collaborate with employers on research aimed at improving adult education and job training. Faculty of schools of education, in concert with colleagues in the liberal arts and sciences, can work with early care and education providers and K–12 teachers and administrators to refine, implement, or challenge the research generated on campus.

Administrators at every level can make research geared to educational improvement part of the daily life of their programs, schools, or institutions, rather than a special project or an occasional activity. Searching for ways to improve student achievement can become part of every administrator's job description. Using the national priorities as a framework, administrators can assure that teachers and parents have access to the research needed to design professional development and learning activities. They can make use of research findings as they work to strengthen their school's (or district's) organization, governance, support services, programs for special populations, and community and parent involvement.

Community leaders can become more familiar with research in each of the seven priority areas, particularly findings that have bearing on their communities. They can help to publicize key findings, so that the full range of learning organizations—early care and education centers, schools, after-school programs, recreational programs, postsecondary institutions, job training programs, and other community organizations—can benefit from what has been discovered about teaching and learning. They can help communities move toward the day when local newspapers looking for front page news, clergy preparing weekly sermons, block

associations seeking a theme for the next meeting, and parenting groups looking forward to their next get-together, all draw upon education research. Community leaders can motivate and help all of these organizations to document and exchange their own experiences for the benefit of the learners for whom they share responsibility.

Political leaders and policy makers can recognize research as an ongoing, continuous function of educational institutions and other settings where people learn. They can make policy that strengthens the capacity of people and organizations to contribute to educational improvement. Leaders can help to bring together many constituencies with a view toward developing a shared understanding of what constitutes quality in various realms of educational practice. Policy makers can also strengthen efforts to ground their decision making in both qualitative and quantitative research.

Education researchers can use the seven priorities to guide and inspire their own investments of energy and resources. The priorities are not prescriptive, but are meant to suggest areas of research that hold promise for strengthening achievement and building upon what we know. Researchers also can address three broad methodological challenges that span all seven priorities. First, in view the of growing prominence of qualitative research, methodological frameworks—protocols, criteria, strategies, languages—need to be developed that can help us compare, synthesize, and draw lessons from diverse studies even when they chronicle very different kinds of experience or represent very different categories of data. Second, approaches need to be developed that integrate quantitative and qualitative research. On one hand, we need to know to what extent the specific stories we tell represent broad patterns or important, instructive deviations from those patterns. On the other hand, we need to be sure that all accounts of learners acknowledge them as complex people who develop and learn in particular settings, not as ciphers or achievement machines. The third challenge is to develop approaches to research that resonate

for both national and local policy and practice. A research effort that focuses on, or seeks to benefit, the school around the corner should not be trivialized or devalued. Chances are, the school around the corner encounters most of the problems facing American education today. The problem is that current research offers few effective tools for linking studies that focus on educational context in particular settings with studies that document patterns of experience across many settings.

Leaders of professional associations can help practitioners at every level bridge research and practice. They can help support studies in their field or discipline that hold promise for improving practice and can lead coordinated efforts to translate those studies into curricula, instructional strategies, and standards for what learners should know and be able to do in a particular content area. They can contribute to professional development efforts, providing assistance to teachers in their field as they seek to become more active producers and consumers of research.

Union leaders, as they advocate for teachers and other school personnel, can promote an expanded notion of the teacher's function to include ongoing research and development linked to school improvement. They can play a leading role in the search for ways to organize the school day and the school year so that teachers have the time and resources they need to take part in research, development, and innovation.

Business leaders can ensure that national and local research efforts are grounded in the realities learners will face in tomorrow's workplace. They can ensure that educational efforts in their own organizations are based on solid research methods and techniques used in providing training initiatives, literacy and family support programs, and on-line information or educational services that can be drawn from education research. Business leaders can marshal the resources of their organizations to support and advance educational research and development through such

measures as large-scale, multisite efforts, action research in local schools, and community-based efforts. And they can form research-oriented partnerships with other learning institutions, including community colleges, research universities, cultural institutions, schools, and community organizations.

Corporations and philanthropic organizations that fund educational initiatives can work toward consensus on criteria for high-quality educational research and development building on national priorities. They can encourage researchers to address the methodological issues described above, ensuring in particular that the efforts they fund resonate for large populations but yield benefits for local programs as well. They can convene meetings and issue publications that bring together many stakeholders in education to discuss the goals, strategies, uses, and risks of research and development. In addition, they can play a role in disseminating and replicating successful initiatives.

Journalists working in every medium can report more frequently and more fully on educational research efforts. While addressing specific findings and their relevance to their audiences, they can help their readers, viewers, or listeners get a better grasp of how educational research can strengthen communities and the nation as a whole. Focusing on the complete set of national priorities, or focusing on single priorities, they can give human faces to the numbers or trends that often seem so remote from Americans' everyday concerns. The media can make a contribution not only by publicizing the results of other people's studies, but also by contributing to research efforts. Many have a substantial research capacity, as well as sizable stores of information such as audience surveys, journalists' observations, and tape or photo evidence. Journalists who interpret research to the public have a special responsibility to understand research findings, their context, their meaning, and their implications for local school improvement efforts.

OERI, the National Educational Research Policy and Priorities Board, and the U.S. Department of Education can lead a national conversation so that everyone involved in the nation's educational enterprise can help to broaden public understanding of the importance of high quality educational research. In addition to sponsoring scientifically rigorous work, OERI can be the catalyst for bold theories and methods that challenge current assumptions. OERI and the Department will use research stimulated by these priorities to help design their own programs and services. OERI, the Board, and the Department will synthesize and disseminate results so that local efforts to improve teaching and learning are informed by reliable high quality evidence.

OERI will work with its partners in the ten regional educational laboratories, the national research and development centers, the ERIC clearinghouses, and other funded programs to determine what implications the priorities have for the future work of these components of the federally-supported research and development infrastructure. This will allow the nationwide system of laboratories, centers, clearinghouses, and other research and development support programs to play an important strategic role in designing and conducting the research and development demanded by these priorities, in developing practical applications of the research, by producing research-based policy proposals, and in disseminating research and research-based solutions to every school and classroom in the nation.

We all can lend voice to the twin tenets that underlie educational research. First, with enough well informed instruction, well targeted resources, and support from parents, teachers, and community members every child can learn. Second, with enough well informed policy, well targeted resources, and support from communities, government agencies, and a wide range of public- and private-sector organizations, every educational institution can improve. In short, we can express confidence in the nation's learners and educational institutions.

Powerful Questions

This country was generated out of powerful questions about how individuals, journeying together, might create a new nation; about how, in a new world, they might live their lives; about how the people making this passage might cast off old habits, solve problems in new ways, and build a better future. This country grew out of bitter conflict, as Americans asked powerful questions about what it means, day by day, to construct a society on the foundation of democratic values. These are the very questions many Americans are asking again as we move into a new century. They are part of our history and our ethos, and they inform our nation's quest to strengthen education.

These national education research priorities are a set of questions that elaborate on the fundamental questions from which our nation evolved. These questions are not the exclusive province of academics or policy makers. They are part of our history and our culture, and they inform the preparation of new generations to carry on that history and revitalize that culture.

Education research, in this sense, is not an academic exercise. It draws on the methods of science to assure its validity and reliability, but it is rarely conducted in remote laboratories. It exploits the power of technology, but it does not stop with silicon or circuitry. Education is about connecting people with the world, and education research is about strengthening those connections. It is something in which all Americans can participate.

If we infuse a more reflective, analytic approach into all of our educational endeavors, we can renew a sense of confidence and hope in our nation's educational enterprise. We can change the tenor of PTA meetings and in-service workshops, of political debate and policy deliberations. We can journey together, using research as a roadmap, toward a future in which all learners and all institutions are

committed to excellence and equity—not just in principle, but in practice. We can use these priorities to develop the core knowledge that drives education reform. And over time, we can create not only livelier classrooms, but also a stronger, more vital nation.

Notes

Prologue

1. Hannah Arendt, "The Crisis in Education," *Partisan Review* (Fall 1958): 494–95.
2. Lawrence A. Cremin, *Popular Education and Its Discontents* (New York: Harper & Row, 1989).
3. U.S. Department of Education, Office of Educational Research and Improvement, *Building on What We've Learned: Developing Priorities for Education Research* (Washington, D.C.: Office of Educational Research and Improvement, May 24, 1996), v–vii.
4. Title IX of Goals 2000: Educate America Act, Public Law 103–227, Sec. 912 (f) (March 31, 1994).
5. U.S. Department of Education, National Center for Education Statistics, *Urban Schools: The Challenge of Location and Poverty*, NCES 96–184, by Laura Lippman, Shelley Burns, and Edith McArthur (Washington, D.C.: U.S. Government Printing Office, 1996).

Chapter 1

1. James Fallows, *More Like Us* (Boston: Houghton Mifflin, 1989).
2. Staff of Fortune Magazine, "An American Vision for the 1990s," *Fortune* 121,7 (1990) 14–16.
3. Shoshana Zuboff, *In the Age of the Smart Machine* (New York: Basic Books, 1988), 395.
4. J. Johnson and J. Immerwahr, *First Things First: What Americans Expect From Public Schools* (New York: Public Agenda Foundation, 1994), 20.
5. U.S. Department of Education, National Center for Education Statistics, *The Condition of Education, 1996* (Washington, D.C.: U.S. Government Printing Office, 1996), 48–49, 142–143; U.S. Department of Education, National Center for Education Statistics, *The Condition of Education, 1994* (Washington, D.C.: U.S. Government Printing Office, 1996), Indicator 46; National Center for Children in Poverty, *Five Million Children: A Statistical Profile of our Poorest Young Citizens* (New York: Columbia University, 1990); U.S. Department of Commerce, Bureau of the Census, *Population Projections of the United States by Age, Sex, Race, and Hispanic Origin: 1995 to 2050*, Current Population Reports, P25–1130 (Washington, D.C.: Bureau of the Census, 1996) 11–17; Aaron M. Pallas, Gary Natriello and Edward L. McDill, "The Changing Nature of the Disadvantaged Population: Current Dimensions and Future Trends, " *Educational Researcher* 18,5 (1989): 16–22.

6. William A. Galston, "Causes of Declining Well-being Among U.S. Children, "*Aspen Quarterly* (Winter 1993): 52–77.

7. U.S. Department of Education, National Center for Education Statistics, *Report in Brief: NAEP 1994 Trends in Academic Progress* (Washington, D.C.: U.S. Government Printing Office, 1996), 4–5.

8. U.S. Department of Education, National Center for Education Statistics, *Report in Brief: NAEP 1994 Trends in Academic Progress*, 17–18.

9. K.S. Louis, R.A. Dentler, and D.G. Kell, *Putting Knowledge to Work: Issues in Educational Dissemination* (Boston: Abt Associates, Inc., and the Center for Survey Research, University of Massachussets, 1984).

10. J.T. Bauman, "Conflict or Compatability in Classroom Inquiry? One Teacher's Struggle to Balance Teaching and Research, " *Educational Researcher* 25,7 (1996) 29–36.

Chapter 2

1. Laura E. Berk, *Child Development*, 3rd edition (Boston: Allyn and Bacon, 1994); David Elkind, *A Sympathetic Understanding of the Child, Birth to Sixteen*, 3rd edition (Boston: Allyn and Bacon, 1994).

2. Carnegie Task Force on Learning in the Primary Grades, *Years of Promise: A Comprehensive Learning Strategy for America's Children* (New York: Carnegie Corporation of New York, 1996) 133.

3. W. Steven Barnett, "Long-Term Effects of Early Childhood Programs on Cognitive and School Outcomes," in Richard E. Behrman, ed., *The Future of Children: Long-Term Outcomes of Early Childhood Programs*,Vol.5, No.3 (1995) 25-50; and Doris R. Entwisle, "The Role of Schools in Sustaining Early Childhood Program Benefits," in the same volume, 133-160.

4. L.J. Schweinhart, H.V. Barnes, and D.P. Weikart, with W.S. Barnett and A.S. Epstein, *Significant Benefits: the High/Scope Perry Preschool Study Through Age 27* (Ypsilanti, MI: High/Scope Press, 1993).

5. Harry T. Chugani, "Neuroimaging of Developmental Non–linearity and Developmental Pathologies." Paper presented at the Families and Work Institute Conference on Brain Development in Young Children: New Frontiers for Research, Policy, and Practice (June 13 and 14, 1996, Chicago, IL). Forthcoming in R.W. Thatcher, G.R. Lyon, J. Rumsey, and N. Krasnegor, eds., *Developmental Neuroimaging: Mapping the Development of Brain and Behavior.*

6. S.L. Kagan and N.E. Cohen, *Solving the Quality Problem: A Vision for America's Early Care and Education System. A Final Report of the Quality 2000 Initiative* (New Haven: Yale University, 1997).

7. Kagan and Cohen (1997).

8. Cost, Quality, and Child Outcomes Study Team, *Cost, Quality, and Child Outcomes in Child Care Centers, Executive Summary* (Denver: University of Colorado, 1995).

9. E. Galinsky, et al., *The Study of Children in Family Child Care and Relative Care* (New York: The Families and Work Institute, 1994).

10. U.S. Department of Education, Office of Special Education and Rehabilitative Services, *Seventeenth Annual Report to Congress on the Implementation of the Individuals with Disabilities Act* (Washington, D.C.: Office of Special Education and Rehabilitative Services, 1995) Table 1.4.

11. U.S. Department of Education, Office of Special Education and Rehabilitative Services (1995) Table AA1.

12. Jeanette A. McCollum and Susan P. Maude, "Portrait of a Changing Field: Policy and Practice in Early Childhood Special Education," in Bernard Spodek, ed., *Handbook of Research on the Education of Young Children* (New York: Macmillan, 1993), 352-371.

13. Carnegie Task Force on Learning in the Primary Grades (1996) 10; D.N. Lloyd, "Prediction of School Failure from Third-Grade Data," *Educational and Psychological Measurement* 38 (1978); K.L. Alexander and D.R. Entwisle, *Achievement in the First 2 Years of School: Patterns and Processes* (Chicago: University of Chicago Press, 1988).

14. Lawrence A. Cremin, *American Education: The Metropolitan Experience 1876–1980* (New York: Harper & Row, 1988).

15. U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics to 2006*, NCES 96–661 (Washington, D.C.: U.S. Government Printing Office, 1996); U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1996* (forthcoming).

16. U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics to 2006*, 76.

17. U.S. Department of Education, National Center for Education Statistics, *Pursuing Excellence: A Study of U.S. Eighth-Grade Mathematics and Science Teaching, Learning, Curriculum, and Achievement in International Context*, NCES 97–198 (Washington, D.C.: U.S. Government Printing Office, 1996), 21.

18. Lauren B. Resnick, *Education and Learning to Think* (Washington, D.C.: National Academy Press, 1987).

19. F. Mosteller, "The Tennessee Study of Class Size in the Early School Grades," *The Future of Children: Critical Issues for Children and Youths*, Vol.5, No.2 (Los Altos, CA: Center for the Future of Children, 1995) 113–127.

20. Valerie E. Lee and Julia B. Smith, "High School Restructuring and Student Achievement: A New Study Finds Strong Links," *Issues in Restructuring Schools*, Issue Report #7 (Madison, WI: Wisconsin Center for Education Research, 1994).

21. U.S. Department of Education, Office of Special Education and Rehabilitative Services (1995) A–36, Table AA16.

22. D.L.Terman et al., "Special Education for Students with Disabilities: Analysis and Recommendations," *The Future of Children: Special Education for Students with Disabilities*, Vol. 6, No.1 (1996), 4–24.

23. Carnegie Task Force on Learning in the Primary Grades, *Years of Promise*, 88.

24. National Commission on Teaching and America's Future, *What Matters Most: Teaching for America's Future* (New York: Teachers College, Columbia University, September 1996); Jeannie Oaks, *Multiplying Inequalities: The Effects of Race, Social Class, and Tracking on Opportunities to Learn Mathematics and Science* (Santa Monica, CA: The RAND Corporation, 1990); Linda Darling-Hammond, "Inequality and Access to Knowledge," in James Banks, ed., *Handbook of Research on Multicultural Education* (New York: Macmillan, 1995).

25. National Commission on Teaching and America's Future, *What Matters Most*, 34–40.

26. National Commission on Teaching and America's Future, *What Matters Most*, 8.

27. National Education Association, *Status of the American Public School Teacher, 1990–91* (Washington, D.C.: NEA, 1992).

28. Carl A. Grant and Walter G. Secada, "Preparing Teachers for Diversity" in W. Robert Houston, ed., *Handbook of Research on Teacher Education* (New York: MacMillan, 1990) 403–422.

29. Madeleine R. Grumet, "Lofty Actions and Practical Thoughts: Education with Purpose, " *Liberal Education* 81,1 (1995) 4–11.

30. Thomas B. Corcoran, "Helping Teachers Teach Well: Transforming Professional Development," *CPRE Policy Brief* #RB-16 (Brunswick, NJ: Consortium for Policy Research in Education, June 1995).

31. National Commission on Teaching and America's Future, *What Matters Most.*

32. New York City Public Schools, "Making Staff Development Pay Off in the Classroom" *Research Brief* #4 (New York: New York City Public Schools, April 1991); M.J. Fullan, "Staff Development, Innovation, and Instructional Development" in B. Joyce, ed., *Changing School Culture Through Staff Development, A Yearbook of the Association for Supervision and Curriculum Development* (Alexandria, VA: Association for Supervision and Curriculum Development, 1990) 3–25; R. Elmore and D. Burney, "Staff Development and Instructional Improvement: Community District 2, NYC." Paper prepared for the National Commission on Teaching and America's Future (1996).

33. Organization of Economic Cooperation and Development, Center for Educational Research and Innovation, *Education at a Glance: OECD Indicators* (Paris, France: OECD, 1995), 88–90.

34. J. Johnson and J. Immerwahr, *First Things First: What Americans Expect from their Public Schools* (New York, New York: Public Agenda Foundation, 1994), 13.

35. U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1995*, 50–51, Table 38.

36. U.S. Department of Education, National Center for Education Statistics, *Condition of Education, 1995*, NCES 95–273 (Washington, D.C.: U.S. Government Printing Office, 1995), 390–392, Table 53–1; see also U.S. Department of Education, National Center for Education Statistics, *Disparities in Public School District Spending: 1989–90*, NCES 95–300, by T.B. Parish, C.S. Matsumoto, and W.J. Fowler (Washington, D.C.: U.S. Government Printing Office, February 1995), Tables A1.1, A1.2, and A2.2.

37. Carnegie Task Force on Learning in the Primary Grades, *Years of Promise*, 103.

38. Michael Cole and Silvia Scribner, *Culture and Thought: A Psychological Introduction* (New York: Wiley, 1974).

39. U.S. Department of Education, National Center for Education Statistics, *Schools and Staffing in the United States: A Statistical Profile, 1993–1994*, NCES 96–124 (Washington, D.C.: U.S. Government Printing Office, 1996), 24, Table 2.3.

40. U.S. Department of Education, National Center for Education Statistics, *Condition of Education, 1995*, 120.

41. Brenda Donly, Allison Henderson, and William Strang, *Summary of State Education Program Survey of States' Limited English Proficient Persons and Available Educational Services, 1993–1994*, Special Issues Analysis Center Annual Report: Year Three, Volume III: SEA Report Task 7. Prepared under contract by Development Associates, Inc. and Westat, Inc. for the U.S. Department of Education, Office of Bilingual Education and Minority Languages Affairs (Arlington, VA: Development Associates, Inc., September 27, 1995).

42. Lily Wong-Fillmore, "Second Language Learning in Children: A Proposed Model," in *Issues in English Language Development* (Arlington, VA: InterAmerica Research Associates, Inc, 1985), 33–44.

43. U.S. Department of Education, National Center for Education Statistics, *Descriptive Summary Report With an Essay on Access and Choice in Postsecondary Education, Statistical Analysis Report on the National Educational Longitudinal Study 1988–1994*, NCES 96–175 (Washington, D.C.: U.S. Government Printing Office, 1996), 36.

44. U.S. Department of Education, National Center for Education Statistics, *Descriptive Summary Report With an Essay on Access and Choice in Postsecondary Education* (1996); U.S. Department of Education, National Center for Education Statistics, *Dropout Rates in the United States: 1994*, NCES 96–863, by Marilyn M. McMillen and Phillip Kaufman (Washington, D.C.: U.S. Government Printing Office, 1996), 8, Table 5; James B. Grissom and Lorrie A. Shepard, "Repeating and Dropping Out of School," in L.A. Shepard and M.L. Smith, eds., *Flunking Grades: Research and Policy on Retention* (Bristol, PA: Falmer Press, 1989).

45. D.R. Entwisle and L.A. Hayduk, *Early Schooling: Cognitive and Affective Outcomes* (Baltimore, MD: Johns Hopkins University Press, 1982), 17.

46. E. E. Werner and R. S. Smith, *Overcoming the Odds: High-Risk Children from Birth to Adulthood* (Ithaca, NY: Cornell University Press, 1992); *Beyond Rhetoric: A New American Agenda for Children and Families.* Final Report of the National Commission on Children (Washington, D.C.: The Commission, 1991).

47. Oliver C. Moles, "Collaboration Between Schools and Disadvantaged Parents: Obstacles and Openings" in Nancy. F. Chavkin, ed., *Families and Schools in a Pluralistic Society* (Albany, NY: State University of New York Press, 1993), 21–49; Nancy F. Chavkin, "Debunking the Myth About Minority Parents," *Education Horizons* (Summer 1989): 119–123.

48. D. Hedin, *School-Age Child Care and Use of Out of School Time by Children and Early Adolescents.* Report for Pillsbury Company (1986).

49. U.S. Department of Education, *National Study of Before and After School Programs, Final Report* (Washington, D.C.: U.S. Government Printing Office, 1993), 17, Table II–1.

50. E. Snyder, "A Longitudinal Analysis of the Relationship Between High School Student Values, Social Participation, and Educational Occupational Achievement," *Sociology of Education* 42 (1969): 261–270.

51. Kenneth Shore, *The Parents' Public School Handbook* (New York: Simon & Schuster, 1994), 291.

52. P. L. Benson, *The Troubled Journey: A Portrait of 6th- and 12th- Grade Youth* (Minneapolis, MN: Search Institute, 1990); M. Hanks and B.K. Eckland, "Adult Voluntary Associations and Adolescent Socialization," *Sociological Quarterly* (Summer 1978): 481–490; L.B. Otto, "Extracurricular Activities in the Educational Attainment Process," *Rural Sociology* 40 (1975): 162–176; K. J. Pittman, *A Rationale For Enhancing the Role of the Non-School Voluntary Sector in Youth Development* (Washington, D.C.: Academy for Educational Development, February 1991); E.S. Scott and S. B. Damico, "Extracurricular Activities and Interracial Contact," *Integrated Education* 21 (1984): 140–142.

53. See, for example, Laurence Steinberg with B. Bradford Brown and Sanford M. Bornbusch, *Beyond the Classroom: Why School Reform Has Failed and What Parents Need To Do* (New York: Simon & Schuster, 1996).

54. D.F. Siegel, "The Acquisition of Reading Skills Across Development: A Process Model for Achievement," (Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA, March 27–31, 1989).

55. U.S. Department of Education, National Center for Education Statistics, *Urban Schools: The Challenge of Location and Poverty*, NCES 96–184, by Laura Lippman, Shelley Burns, and Edith McArthur (Washington, D.C.: U.S. Government Printing Office, 1996).

56. Carnegie Task Force on Learning in the Primary Grades, *Years of Promise* (1996).

57. Joyce Epstein, "School and Family Partnerships" in M. Alkin, ed., *Encyclopedia of Educational Research*, 6th edition (MacMillan: New York, New York, 1992), 1139–51.

58. Joy G. Dryfoos, *Full-Service Schools: A Revolution in Health and Social Services for Children, Youth, and Families* (San Francisco, CA: Jossey-Bass, 1994).

59. U.S. Department of Education, National Center for Education Statistics, *Adult Literacy in America: A First Look at Results of the National Adult Literacy Survey*, by Irwin S. Kirsch, Ann Jungeblut, Lynn Jenkins, and Andrew Kolstad (Washington, D.C.: U.S. Government Printing Office, 1993), 17.

60. Page Smith, *Killing the Spirit: Higher Education in America* (New York: Penguin, 1990); Ernest L. Boyer, *College: The Undergraduate Experience in America* (New York: Harper & Row, 1987); Henry Rosovsky, *The University: An Owner's Manual* (New York: W.W. Norton, 1990).

61. U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1995*, 177, Table 168.

62. U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1995*, 247, Table 233.

63. U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1995*, 179–180, Tables 170 and 171, with graduate students and students of unknown age removed from the equation.

64. U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1995*, 207–209, Tables 200 and 201.

65. Jay Jamrog, Director of Research, Human Resource Institute at Eckerd College as cited in Jennifer J. Laabs, "Eyeing Future HR Concerns, "*Personnel Journal* (January 1996): 28–37; see also Melody Jones, "Four Trends to Reckon With," *Human Resources Focus* 73, 7 (1966).

66. Tom Amirault, *Job Qualifying and Skill Improvement Training: 1991* (Washington, D.C.: U.S. Department of Labor, Bureau of Labor Statistics, 1992).

67. Commission on the Skills of the American Workforce, *America's Choice: High Skills or Low Wages!* (Rochester, NY: National Center on Education and the Economy, 1990), chapter 5; Joel Dryfuss, "Get Ready for the New Work Force, " *Fortune* (April 23, 1990): 176.

Chapter 3

1. Louis V. Gerstner, Jr., *Reinventing Education: Entrepreneurship in Today's Public Schools* (New York: NAL-Dutton, 1994).

Sources for Sidebars and Data Boxes

Sources for New Strands of Research

"Science Mimics Nature: Abracadabra! Abalone and Spider Silk," *The New York Times*, Aug. 31, 1993, C-8.

Sources for Early Childhood Learning Sidebar

Cox, S.T. 1990. Whose the boss?: Dynamic tensions in oral storybook reading. *International Journal of Qualitative Studies in Education* 3:231-52.

Goetz, J. P., and M.D.Lecompte. 1984. *Ethnography and qualitative design in educational research.* Orlando, FL: Academic Press.

Howe, K. and M.Eisenhart. 1990. Standards for qualitative (and quantitative) research: A prolegomenon. *Education Researcher* 19(4):2-9.

Leavitt, R.L. 1991. Power and resistance in infant-toddler day care centers. In *Sociological studies of child development*, vol.4, ed. S. E. Cahill. Greenwich, Connecticut: JAI.

Nelson, M. 1991. *Negotiated care: The experience of family day care providers.* Philadelphia: Temple.

Walsh, D. J., J. J. Tobin, and M. E. Graue. 1993. The interpretive voice: Qualitative research in early childhood education. In *Handbook of research on the education of young children*, ed. Bernard Spodek. New York: Macmillan.

Sources for Early Childhood Learning Data Box

Hofferth, S. L. 1996. An overview of current child care in the United States today. *The future of children: Financing child care,*Vol.6, No.2. Los Altos, CA: The Center for the Future of Children.

Kagan, S.L., and N.E. Cohen. 1997. *Solving the quality problem: A vision for America's early care and education system.* New Haven, Connecticut: Yale University.

U. S. Department of Education, National Center for Education Statistics. 1995. *Approaching kindergarten: A look at preschoolers in the United States.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1995. *Digest of education statistics, 1995.* Washington, D.C.: U.S. Government Printing Office.

Sources for Student Learning Sidebar

American Federation of Teachers. 1996. *Making standards matter 1996: An annual fifty-state report on efforts to raise academic standards.* Washington, D.C.: American Federation of Teachers.

Finn, Jr., C. E., and D. Ravitch. 1996. *Education reform 1995-1996.* Indianapolis, Indiana: Hudson Institute.

Johnson, J. 1995. *Assignment incomplete: The unfinished business of education reform.* New York: Public Agenda.

Sources for Student Learning Data Box

U.S. Department of Education. National Center for Education Statistics. 1996. *The condition of education, 1996.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1995. *Digest of education statistics, 1995.* Washington, DC: U.S. Government Printing Office.

Sources for Effective Teaching Sidebar

California Department of Education. Elementary Grades Task Force. 1994. *It's elementary! Recommendations for achieving excellence in California's elementary schools.* Preview Edition. Sacramento, CA: California State University.

Little, J.W. 1990. The persistence of privacy: Autonomy and initiative in teachers' professional relations. *Teachers College Record* 91:509-536.

Purnell, S.W., and P.T. Hill. 1992. *Time for reform.* Santa Monica, California: The RAND Corporation.

United States National Education Commission on Time and Learning. 1994. *Prisoners of time.* Washington, D.C.: US Government Printing Office.

Sources for Effective Teaching Data Box

U.S. Department of Education. National Center for Education Statistics. 1996. *Schools and staffing in the United States: A statistical profile, 1993-94.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1995. *Digest of education statistics, 1995.* Washington, D.C.: U.S. Government Printing Office.

Sources for Strengthening Schools Sidebar

U.S. Department of Education. Office of Educational Research and Improvement. 1996. *Taking reform to scale.* Unpublished paper. Washington, D.C.: Office of Educational Research and Improvement.

Sources for Strengthening Schools Data Box

U.S. Department of Education. National Center for Education Statistics. 1996. *The condition of education, 1996.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1995. *Digest of education statistics, 1995.* Washington, D.C.: U.S. Government Printing Office.

Sources for Student Diversity Sidebar

Heath, S. B. 1983. *Ways with words: Language, life, and work in communities and classrooms.* Cambridge, Massachusetts: Cambridge University Press.

Sources for Student Diversity Data Box

Donly, B., A. Henderson, and W. Strang. 1995. *Summary of state education program survey of states' limited english proficient persons and available education services, 1993-1994.* Arlington, Virginia: Development Associates, Inc.

U.S. Department of Education. National Center for Education Statistics. 1996. *Report in brief: NAEP 1994 trends in academic progress.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1995. *The condition of education, 1995.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1994. *The condition of education, 1994.* Washington, D.C.: U.S. Government Printing Office.

Sources for Beyond the Classroom Sidebar

Sabo, Don. 1989. *The Women's Sports Foundation Report: Minorities in Sports.* Northeastern University: Center for the Study of Sport in Society.

Sizer, T. R. 1984. *Horace's compromise, the dilemma of the American high school.* Boston: Houghton Mifflin.

Soltz, D.F. 1986. Athletics and academic achievement: What is the relationship? *NASSP Bulletin* 70: 20, 22-24.

Sources for Beyond the Classroom Data Box

Adelman, N., ed. 1995. *A research review: The educational uses of time.* Unpublished Report. U.S. Department of Education. Office of Educational Research and Improvement. Washington, D.C.: Office of Educational Research and Improvement.

U.S. Department of Education. National Center for Education Statistics. 1996. *Report in brief: NAEP 1994 trends in academic progress.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1995. *Digest of education statistics, 1995.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. 1993. *National study of before and after school programs, final report.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1990. *National Education Longitudinal Study of 1988: A profile of the American eighth-grader.* Washington, D.C.: U.S. Government Printing Office.

Sources for Adult Competence Sidebar

U.S. Department of Education. 1996. *Getting America's students ready for the 21st century: Meeting the technology literacy challenge. A report to the nation on technology and education.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1995. *Digest of education statistics, 1995.* Washington, D.C.: U.S. Government Printing Office.

Sources for Adult Competence Data Box

National Center on Adult Literacy. 1995. *Adult literacy: The next generation.* Technical Report TR95-01. Philadelphia: National Center on Adult Literacy.

U.S. Department of Education. National Center for Education Statistics. 1995. *The condition of education, 1995.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1995. *Digest of education statistics, 1995.* Washington, D.C.: U.S. Government Printing Office.

Bibliography

Adelman, N., ed. 1995. *A research review: The educational uses of time.* Unpublished Report. U.S. Department of Education. Office of Educational Research and Improvement.

Alexander, K.L. and D.R. Entwisle. 1988. *Achievement in the first 2 years of school: Patterns and processes* Chicago, IL: University of Chicago Press.

American Federation of Teachers. 1996. *Making standards matter 1996: An annual fifty-state report on efforts to raise academic standards.* Washington, D.C.: American Federation of Teachers.

Amirault, T. 1992. *Job qualifying and skill improvement training: 1991.* Washington, D.C.: U.S. Department of Labor, Bureau of Labor Statistics. Washington, D.C.: U.S. Government Printing Office.

An American vision for the 1990s. 1990. *Fortune,* March, 14-16.

Arendt, H. 1958. The crisis in education. *Partisan Review* (Fall): 494-95.

Barnett, W. S. 1995. Long-terms effects of early childhood programs on cognitive and school outcomes. In *The future of children: Long-term outcomes of early childhood programs,*vol. 5, no. 3, ed. R. E. Behrman. Los Altos, CA: Center for the Future of Children.

Bauman, J.T. 1996. Conflict or compatability in classroom inquiry? One teacher's struggle to balance teaching and research. *Educational Researcher* 25(7): 29-36.

Benson, P.L. 1990. *The troubled journey: A portrait of 6th- and 12th- grade youth.* Minneapolis, Minnesota: Search Institute.

Berk, L.E. 1994. *Child development,* 3rd ed. Boston: Allyn and Bacon.

Boyer, E.L. 1987. *College: The undergraduate experience in America.* New York: Harper and Row.

California Department of Education. Elementary Grades Task Force. 1994. *It's elementary! Recommendations for achieving excellence in California's elementary schools.* Preview Edition. Sacramento, CA: California State University.

Carnegie Task Force on Learning in the Primary Grades. 1996. *Years of promise: A comprehensive learning strategy for America's children.* New York: Carnegie Corporation of New York.

Chavkin, N.F. 1989. Debunking the myth about minority parents. *Education Horizons* (Summer).

Chugani, H. T. Neuroimaging of developmental non-linearity and developmental pathologies. In *Developmental neuroimaging: Mapping the development of brain and behavior*, eds., R.W. Thatcher, G.R. Lyon, J. Rumsey, and N. Krasnegor. Forthcoming.

Cole, M. and S. Scribner. 1974 *Culture and thought: A psychological introduction.* New York: Wiley and Sons.

Commission on the Skills of the American Workforce. 1990. *America's choice: High skills or low wages!* Rochester, New York: National Center on Education and the Economy.

Corcoran, T.B. 1995. Helping teachers teach well: Transforming professional development *CPRE Policy Brief,* #RB-16. Brunswick, New Jersey: Consortium for Policy Research in Education.

Cost, Quality, and Child Outcomes Study Team. 1995. *Cost, quality, and child outcomes in child care centers, executive summary.* Denver: University of Colorado.

Cox, S.T. 1990. Whose the boss?: Dynamic tensions in oral storybook reading. *International Journal of Qualitative Studies in Education* 3:231-52.

Cremin, L. A. 1988. *American education: The metropolitan experience 1876-1980.* New York: Harper and Row.

Cremin, L.A. 1989. *Popular education and its discontents.* New York: Harper & Row.

Crouson, R. L., and W. L. Boyd. 1993. Coordinated services for children: Designing arks for storms and seas unknown. *American Journal of Education* 101(February): 141.

Darling-Hammond, L. 1995. Inequality and access to knowledge. In *Handbook of research on multicultural education*, ed. James Banks. New York: Macmillan.

Donly, B., A. Henderson, and W. Strang. 1995. *Summary of state education program survey of states' limited english proficient persons and available educational services, 1993-1994.* Special Issues Analysis Center Annual Report: Year Three, Volume III. SEA Report Task 7. Arlington, Virginia: Development Associates, Inc.

Dryfoos, J.G. 1994. *Full-service schools: A revolution in health and social services for children, youth, and families.* San Francisco: Jossey Bass.

Dryfuss, J. 1990. "Get Ready for the New Work Force," *Fortune*, April, 176.

Elkind, David. 1994. *A sympathetic understanding of the child, birth to sixteen,* 3rd ed. Boston: Allyn and Bacon.

Elmore, R. and D. Burney. 1996. Staff development and instructional improvement: Community District 2, NYC. Paper prepared for the National Commission on Teaching and America's Future.

Entwisle, D.R. and L.A. Hayduk. 1982. *Early schooling: Cognitive and affective outcomes.* Baltimore: Johns Hopkins University Press.

Entwisle, D. R. 1995. The role of schools in sustaining early childhood program benefits in *The future of children: Long-term outcomes of early childhood programs*,vol. 5, no. 3, ed. Richard E. Behrman. Los Altos, CA: Center for the Future of Children.

Epstein, J. 1992. School and family partnership. In *Encyclopedia of educational research*, 6th edition, ed. M. Alkin, 1139-51. New York: MacMillan.

Fallows, James. 1989. *More like us.* Boston: Houghton Mifflin.

Finn, Jr., C. E., and D. Ravitch. 1996. *Education reform 1995-1996.* Indianapolis, Indiana: Hudson Institute.

Fullan, M.J. 1990. Staff development, innovation, and instructional development. In *changing school culture through staff development: A yearbook of the association for supervision and curriculum development*, ed., B. Joyce. Alexandria, Virginia: Association for Supervision and Curriculum Development.

Galinsky, E., et al. 1994. *The study of children in family child care and relative care.* New York: The Families and Work Institute.

Galston, William A. 1993. Causes of declining well-being among U.S. children. *Aspen Quarterly.* Winter: 52-77.

Gerstner, Jr., L. V. 1994. *Reinventing education: Entrepreneurship in today's public schools.* New York: NAL-Dutton.

Goetz, J. P., and M.D.Lecompte. 1984. *Ethnography and qualitative design in educational research.* Orlando, Florida: Academic Press.

Grant, C. A. and W. G. Secada. 1990. Preparing teachers for diversity. In *Handbook of research on teacher education*, ed. W. Robert Houston. New York: MacMillan.

Grissom, J. B. and L. A. Shepard. 1989. Repeating and dropping out of school. In *Flunking grades: Research and policy on retention*, ed. L.A. Shepard and M.L. Smith. Bristol, PA: Falmer Press.

Grumet, Madeleine R. 1995. Lofty actions and practical thoughts: Education with purpose, *Liberal Education* 81: 4-11.

Hanks, M. and B.K. Eckland. 1978. Adult voluntary associations and adolescent socialization. *Sociological Quarterly* 19: 481-90.

Heath, S. B. 1983. *Ways with words: Language, life, and work in communities and classrooms.* Cambridge: Cambridge University Press.

Hedin, D. 1986. *School-age child care and use of out of school time by children and early adolescents.* Report for Pillsbury Company.

Howe, K. and M. Eisenhart. 1990. Standards for qualitative (and quantitative) research: A prolegomenon. *Education Researcher* 19:2-9.

Johnson, J. and J. Immerwahr. 1994. *First things first: What Americans expect from their public schools.* New York, New York: Public Agenda.

Johnson, J. 1995. *Assignment incomplete: The unfinished business of education reform.* New York: Public Agenda.

Jones, M. 1966. Four trends to reckon with. *Human Resources Focus* 73 (7).

Kagan, S.L. and N.E. Cohen. 1997. *Solving the quality problem: A vision for America's early care and education system. A final report of the Quality 2000 Initiative.* New Haven: Yale University.

Kirsch, I.S., A. Jungeblut, L. Jenkins, and A. Kolstad. 1993. *Adult literacy in America: A first look at results of the National Adult Literacy Survey.* Washington, D.C.: U.S. Government Printing Office.

Laabs, J.J. 1996. Eyeing future HR concerns. *Personnel Journal* 75: 28-37.

Leavitt, R.L. 1991. Power and resistance in infant-toddler day care centers. In *Sociological studies of child development*, vol.4, ed. S. E. Cahill. Greenwich, Connecticut: JAI.

Lee, V. E. and J. B. Smith. 1994. High school restructuring and student achievement: A new study finds strong links. *Issues in restructuring schools*, Issue Report #7. Madison, Wisconsin: Wisconsin Center for Education Research.

Lippman, L., S. Burns, and E. McArthur. 1996. *Urban schools: The challenge of location and poverty.* U.S. Department of Education. National Center for Education Statistics. Washington, D.C.: U.S. Government Printing Office.

Little, J. W. 1990. The Persistence of privacy: Autonomy and initiative in teachers' professional relations. *Teachers College Record* 91:509-536.

Lloyd, D.N. 1978. Prediction of school failure from third-grade data. *Educational and Psychological Measurement* 38: 1193-1200.

Louis, K.S., R.A. Dentler, and D.G. Kell. *1984. Putting knowledge to work: Issues in educational dissemination.* Boston: Abt Associates, Inc., and the Center for Survey Research, University of Massachussets.

McCollum, J. A. and Susan P. Maude. 1993. Portrait of a changing field: Policy and practice in early childhood special education. In *Handbook of Research on the Education of Young Children*, ed. Bernard Spodek. New York: Macmillan.

McMillen, M. M. and P. Kaufman. 1996. *Dropout rates in the United States: 1994.* U.S. Department of Education. National Center for Education Statistics. Washington, D.C.: U.S. Government Printing Office.

Moles, O.C. 1993. Collaboration between schools and disadvantaged parents: Obstacles and openings. In *Families and schools in a pluralistic society*, ed. Nancy. F. Chavkin. Albany, NY: State University of New York Press.

Mosteller, F. 1995. The Tennessee study of class size in the early school grades. *The future of children: Critical issues for children and youths*, vol. 5, no. 2. Los Altos, CA: Center for the Future of Children.

National Center for Children in Poverty. 1990. *Five million children: A statistical profile of our poorest young citizens.* New York: Columbia University.

National Center on Adult Literacy. 1995. *Adult literacy: The next generation.* NCAL Technical Report TR95-01. Philadelphia: National Center on Adult Literacy.

National Commission on Children. Beyond rhetoric: A new American agenda for children and families. 1991. Final Report of the National Commission on Children. Washington,D.C.

National Commission on Teaching and America's Future. 1996. *What matters most: Teaching for America's future.* New York: Teachers College, Columbia University.

National Education Association. *Status of the American public school teacher 1990-91. 1992.* Washington, D.C.: National Education Association.

Nelson, M. 1991. *Negotiated care: The experience of family day care providers.* Philadelphia: Temple.

New York City Public Schools. 1991. Making staff development pay off in the classroom. *Research Brief #4* . New York: New York City Public Schools.

Oaks, J. 1990. *Multiplying inequalities: The effects of race, social class, and tracking on opportunities to learn mathematics and science.* Santa Monica, California: RAND Corporation.

Organization for Economic Cooperation and Development. Center for Educational Research and Innovation. 1995. *Education at a glance: OECD Indicators.* Paris: Organization for Economic Cooperation and Development.

Otto, L.B. 1975. Extracurricular activities in the educational attainment process. *Rural Sociology* 40: 162-76.

Pallas, A.M., G. Natriello and E. L. McDill. 1989. The changing nature of the disadvantaged population: Current dimensions and future trends. *Educational Researcher* 18 (5) 16-22.

Parish, T.B., C.S. Matsumoto, and W.J. Fowler. 1995. *Disparities in public school district spending: 1989-90.* U.S. Department of Education. National Center for Education Statistics. Washington, D.C.: U.S. Government Printing Office.

Pittman, K. J. 1991. *A rationale for enhancing the role of the non-school voluntary sector in youth development.* Washington, D.C.: Academy for Educational Development.

Public Law 103-227. March 31, 1994. Goals 2000: Educate America Act. 103d Congress.

Purnell, S.W. and P.T. Hill. 1992. *Time for reform.* Santa Monica: The RAND Corporation.

Resnick, L. B. 1987. *Education and learning to think.* Washington, D.C.: National Academy Press.

Rosovsky. H. 1990. *The university: An owner's manual.* New York: W.W. Norton.

Sabo, Don. 1989. *The Women's Sports Foundation Report: Minorities in sports.* Northeastern University: Center for the Study of Sport in Society.

Schweinhart, L.J., H.V. Barnes, D.P. Weikart, with W.S. Barnett and A.S. Epstein. 1993. *Significant benefits: The High/Scope Perry Preschool study through age 27.* Ypsilanti, Michigan: High/Scope Press.

Scott, E.S. and S. B. Damico. 1984. Extracurricular activities and interracial contact. *Integrated Education* 2: 140-142.

Shore, K. 1994. *The parents' public school handbook.* New York: Simon and Schuster.

Siegel, D.F. 1989. The acquisition of reading skills across development: A process model for achievement. Paper presented at the annual meeting of the American Educational Research Association. San Francisco: American Education Research Agenda.

Sizer, T. R. 1984. *Horace's compromise, The dilemma of the American high school.* Boston: Houghton Mifflin.

Smith, P. 1990. *Killing the spirit: Higher education in America.* New York: Penguin.

Snyder, E. 1969. A longitudinal analysis of the relationship between high school student values, social participation, and educational occupational achievement. *Sociology of Education* 42: 261-270.

Soltz, D.F. 1986. Athletics and academic achievement: What is the relationship? *NASSP Bulletin* 70 (492): 20-24.

Steinberg, L. with B. Bradford Brown and S. M. Bornbusch. 1996. *Beyond the classroom: Why school reform has failed and what parents need to do.* New York: Simon and Schuster.

Terman, D.L., M. Larner, C. Stevenson, and R. Behrman. 1996. Special education for students with disabilities: Analysis and recommendations. *The future of children: Special education for students with disabilities*, vol.6, no.1. Los Altos, CA: Center for the Future of Children.

U.S. Department of Commerce. Bureau of the Census. 1996. *Population projections of the United States by age, sex, race, and Hispanic origin: 1995 to 2050.* Washington, D.C.: Bureau of the Census.

U.S. Department of Education. 1996. Getting America's students ready for the 21st century: Meeting the technology literacy challenge. *A report to the nation on technology and education.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. 1993. *National study of before and after school programs, Final Report.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1996. *The condition of education, 1996.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1996. *Descriptive summary report with an essay on access and choice in postsecondary education.* Statistical analysis report on the National Educational Longitudinal Study 1988-1994. Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. *Digest of education statistics, 1996.* Forthcoming.

U.S. Department of Education. National Center for Education Statistics. 1996. *Projections of education statistics to 2006.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1996. *Pursuing excellence: A study of U.S. eighth-grade mathematics and science teaching, learning, curriculum, and achievement in international context.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1996. *Report in brief: NAEP 1994 trends in academic progress.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1996. *Schools and staffing in the United States: A statistical profile,1993-1994.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1996. *Urban schools: The challenge of location and poverty.* Washington, D.C.: U.S. Government Printing Office.

U. S. Department of Education, National Center for Education Statistics. 1995. *Approaching kindergarten: A look at preschoolers in the United States.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1995. *Condition of education 1995.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1995. *Digest of education statistics, 1995.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1994. *The condition of education, 1994.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. National Center for Education Statistics. 1990. *National Education Longitudinal Study of 1988: A profile of the American eighth-grader.* Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Education. Office of Educational Research and Improvement. 1996. *Building on what we've learned: Developing priorities for education research.*Washington, D.C.: Office of Educational Research and Improvement.

U.S. Department of Education, Office of Educational Research and Improvement. 1996. *Taking reform to scale.* Unpublished report. Washington, D.C.: Office of Educational Research and Improvement.

U.S. Department of Education. Office of Special Education and Rehabilitative Services. 1995. *Seventeenth annual report to Congress on the implementation of the Individuals with Disabilities Act*. Washington, D.C.: Office of Special Education and Rehabilitative Services.

United States National Education Commission on Time and Learning. 1994. *Prisoners of time*. Washington, D.C.: U.S. Government Printing Office.

Walsh, D. J., J. J. Tobin, and M. E. Graue. 1993. The interpretive voice: Qualitative research in early childhood education. In *Handbook of research on the education of young children*, ed. Bernard Spodek. New York: Macmillan.

Werner , E. E. and R. S. Smith. 1992. *Overcoming the odds: High-risk children from birth to adulthood*. Ithaca, New York: Cornell University Press.

Wong-Fillmore, L. Second language learning in children: A proposed model. 1984. In *Issues in English language development*, 33-44. Arlington, Virginia: InterAmerica Research Associates.

Zuboff , S. 1988. *In the age of the smart machine*. New York: Basic Books.

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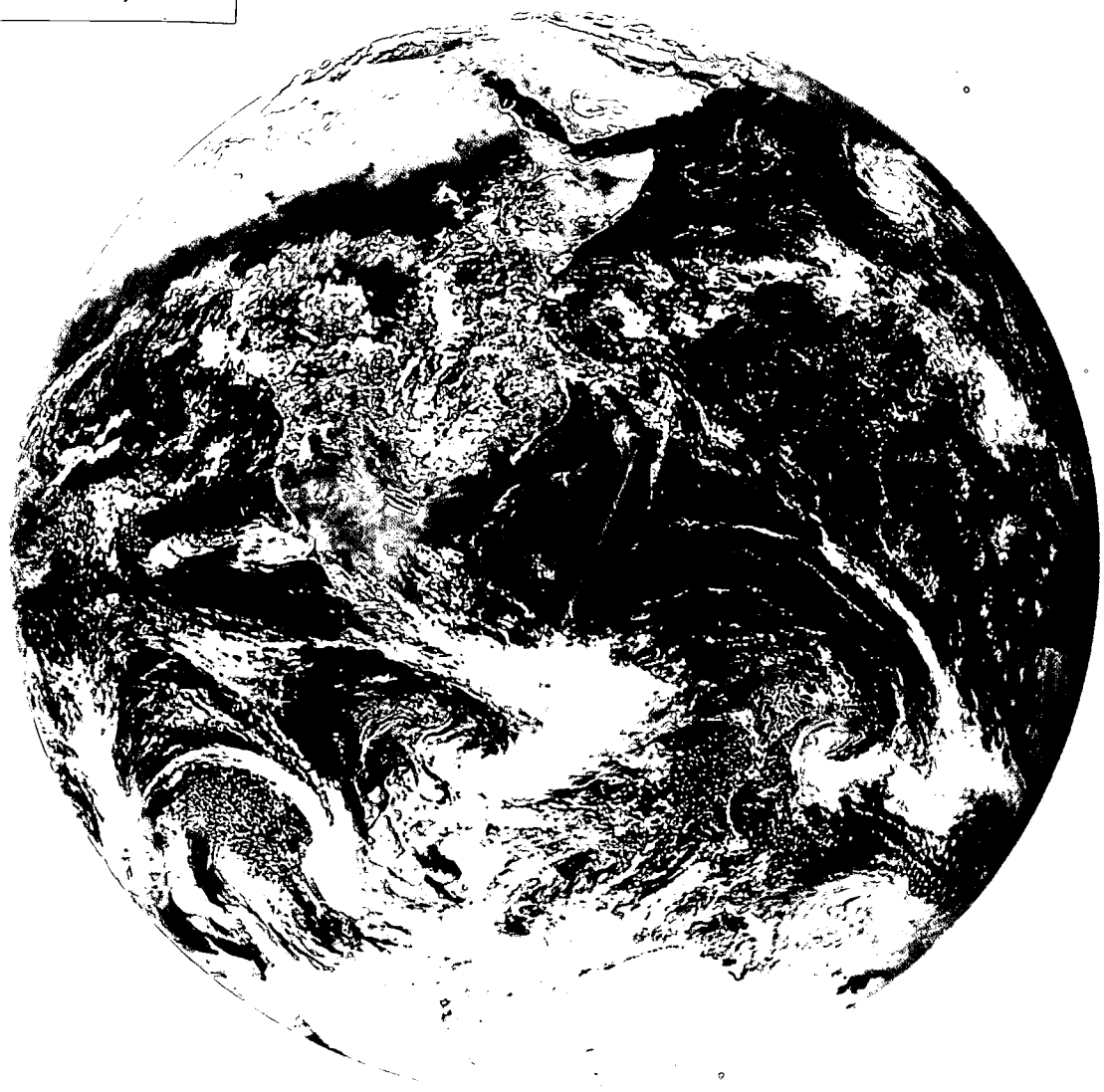

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